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THE AIR POLLUTION BIBLIOGRAPHY. VOLUME II

Arnold J. Jacobius, et al

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THE
AIR POLLUTION BIBLIOGRAPHY

Volume II

by

Arnold J. Jacobius
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Compiled for the Public Health Service
U. S. Department of Health, Education, and Welfare

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AIR POLLUTION BIBLIOGRAPHY

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Washington, D. C., 1959

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PREFACE

This second volume of the Air Pollution Bibliography was compiled by the Bibliography Section of the Science and Technology Division of the Library of Congress for the U. S. Public Health Service, Department of Health, Education, and Welfare, under a letter of agreement dated July 5, 1957. It follows closely the first volume (The Air Pollution Bibliography, Vol. I, by Jack R. Gibson, Wave E. Culver, and Mary E. Kurz. Washington, July 1957) in arrangement, form of entry, type of abstracts, and subject scope. The subject index, which cumulates the entries of Volumes I and II, has been considerably expanded and presents a more detailed topical breakdown. It should be noted that this volume, like Volume I, includes material published over a span of years (1952-1958), selected more or less at random.

It may be of interest to note that the Library of Congress, in cooperation with the U. S. Public Health Service and the Air Pollution Control Association, 4400 5th Avenue, Pittsburgh 13, Pa., is presently publishing abstracts of current air pollution literature in APCA Abstracts. The material abstracted by the Library staff is being selected from both domestic and foreign journals in the fields of physiology, medicine, and agriculture, and from foreign journals in other fields.

Acknowledgements

The compilers wish to extend their thanks to Messrs. Frank Tetzlaff, Robert Perman, and Dr. Otis L. Emik of the U. S. Public Health Service for their counsel and assistance. Special acknowledgements are due to Mr. Richard A. Barlow for the preparation of the cover design. We thank our fellow members of the Bibliography Section who have helped with the publication, particularly Mr. Leroy D. Davis, Miss Eugenia M. Henry, Mrs. Vernadine Hierst, Mrs. Beatrice T. Treese, and Mrs. Virginia K. Sims. Finally, we wish to express our appreciation to the staff members of the National Library of Medicine, the Department of Agriculture Library, and the Armed Services Technical Information Agency for their kind assistance.

Washington, D. C.
April 1959

SERIAL TITLE ABBREVIATIONS

The following is a key to the serial title abbreviations used herein:

Acad.	Academy	Mech.	Mechanical
Advanc.	Advancement	Med.	Medical, Medicine
Agric.	Agricultural, Agriculture	Méd.	Médecine
Amer.	American	Meteorol.	Meteorological, Meteorology
Analyt.	Analytical	Microchim.	Microchimica
Ann.	Annals, Annual		
Appl.	Applicata, Applied	Opt.	Optical
Arch.	Archiv, Archives		
Assoc.	Association	Pathol.	Pathology
Austral.	Australian	Phys.	Physics
		Physiol.	Physiology
Belg.	Belges	Phytopathol.	Phytopathology
Biochem.	Biochemical	Pollut.	Pollution
Biol.	Biology	Proc.	Proceedings
Brit.	British	Progr.	Progress
Bull.	Bulletin	Publ.	Public, Publication
Calif.	California	Quart.	Quarterly
Canad.	Canadian		
Chem.	Chemical, Chemistry	Rec.	Record
Clin.	Clinical	Rep.	Reports
Coll.	College	Res.	Research
Contr.	Contributions	Rev.	Review(s)
		Roy.	Royal
Div.	Division		
		S. A. E.	Society of Automotive Engineers
Elec.	Electric, Electrical	Sci.	Science
Eng.	Engineering	Scient.	Scientific
Exper.	Experiment	Soc.	Society
		Sta.	Station
Geofis.	Geofisica	Surg.	Surgery
Hort.	Horticultural	Tech.	Technical, Technology
Hyg.	Hygiene	Trans.	Transactions
Indus.	Industrial, Industries	Univ.	University
Inst.	Institute		
Instrum.	Instrument(s)	Zeitschr.	Zeitschrift
Internat.	International, Internationalis		
Jour.	Journal		

LIBRARY SYMBOLS

DA	U. S. Department of Agriculture, Washington, D. C.
DBS	U. S. National Bureau of Standards, Washington, D. C.
DGS	U. S. Geological Survey, Washington, D. C.
DLC	U. S. Library of Congress, Washington, D. C.
DLC-Sci	Science and Technology Division, Library of Congress, Washington, D. C.
DNLM	U. S. National Library of Medicine, Washington, D. C.
DPH	U. S. Public Health Service, Department of Health, Education, and Welfare, Washington, D. C.

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- Adams, D. F., 1956
C. G. Shaw, and W. D. Yerkes.
RELATIONSHIP OF INJURY INDEXES AND FUMIGATION FLUORIDE LEVELS. *Phytopathol.*, v. 46, Dec. 1956: 587-591. DLC (S8599, P935, v. 46)

Fumigation of 2 varieties of gladiolus at 3 fumigation levels for different exposure times indicated a direct relationship between the fumigation exposure factors and the foliar injury produced. Fluorine damage to gladiolus has been described as a "burned" appearance extending from the tips downward. It was found that needles of the *Pinus ponderosa* were many times more sensitive to fluoride fumigation in the immature, partially elongated state, than in the mature, completely elongated state. Statistical relationships between injury indexes, and exposure factors are discussed. Illustrations and tables are included.

- 752 Adams, D. F. 1957
FURTHER APPLICATIONS OF THE LIMED FILTER
PAPER TECHNIQUE IN FLUORINE AIR POLLUTION
STUDIES. Jour. Air Pollut. Control Assoc., v. 7,
Aug. 1957: 88-91. DLC (TP883.A48, v. 7)

The exposure of lime-treated filter papers under protection of wooden shelters provides a method of detecting atmospheric fluorides. Tests for comparative fluoride levels in duplicate shelters show that only small differences in fluorine content may exist between duplicate shelters under similar conditions. It was found that a curvilinear relationship exists between average monthly lime paper fluoride levels and fluoride accumulated in herbage during the growing season. Results of the lime paper technique in measuring relative fluoride pollution levels from one year to another are discussed. Tables are included.

- Adams, D. F.,
H. J. Dana, and R. E. Koppe.
"UNIVERSAL" AIR POLLUTION ANALYZER. Public
Health Service (U.S.). Robert A. Taft Sanitary Engi-
neering Center, Cincinnati, Ohio. Sept. 1957. 37 p.,
illus. **DLC-Sci**

BIBLIOGRAPHY

Two prototype automatic atmospheric pollutant analyzers suitable for producing dosimeter or continuously integrated records have been designed and constructed. The Zirconium-Eriochrome-Cyanine-R reagent for fluoride and the Starch-Iodine-Blue Reagent for sulfur dioxide have been modified for use in the analyzers. The reduced stability of these reagents under continuous aeration for periods exceeding 4-12 hr, limits the pollutant concentration which may be accumulated by a single reagent charge. This appears, however, to be desirable from the viewpoint of field application. The instrument has been held-tested for three weeks in the vicinity of Mead, Washington and Waneta, British Columbia. Simultaneous comparisons were made between the Thomas Autometer, Titrllog and the Dosimeter for sulfur dioxide and an automatic scrubbing solution collector and the Dosimeter for hydrogen fluoride. The instrument shows greater sensitivity to these two pollutants than other instrumental methods commercially available. (Authors' abstract)

- 754
Adler, C. R.,
and others. 1954
A SCANNING DEVICE FOR DETERMINING THE SIZE
DISTRIBUTION OF SPRAY DROPLET IMAGES. Chem.
Eng. Progr., v. 50, Jan. 1954: 14-23, illus.
DLC (TP1.A6. v. 50)

An instrument is described which utilizes a scanning technique to count and classify spray droplet images on photographic negatives. These negatives, mounted on a rotating drum, are projected by an optical system and focussed at the plane of a mask containing a small aperture located directly in front of a photomultiplier tube. As the droplet images rotate past this aperture, they are simultaneously advanced a small distance each revolution by the rotating drum. In this manner, the phototube receives through the aperture a series of light pulses whose durations correspond to the lengths of the chords created whenever a drop image passes across the aperture. These light pulses of various time durations are converted into electrical pulses and fed into electronic sorter-counter circuits which classify the chords into 15 size classes. A statistical treatment of this chord distribution is then made to give drop-size distribution. Tables of coefficients have been computed to permit rapid conversion of the chord distribution. The statistical theory on which these coefficients are based is presented. Results of tests on actual spray samples, and on special test negatives,

demonstrated that the device rapidly will count and classify drops with acceptable accuracy. The scanning rate can be as high as 10,000 drops in 15 minutes at maximum drum speed. The instrument removes the human element from the counting process, scans all drops in a single complete travel of the drum, simultaneously counts and classifies drops into 15 size classes or less, and counts much faster with greater accuracy than a human operator. It is restricted, however, to the analysis of transparent images on photographic negatives, which requires the sampling of sprays by collecting droplets in cells on greased or soot-coated slides and photographing them. (Authors' abstract in part)

755

1953

AEROSOL CAMERA. Heating and Ventilating, v. 50, Sept. 1953: 136. DLC (TH7201.H4, v. 50)

The Stanford Research Institute announced the development of a new camera to be used for photographing particles floating in the atmosphere. Particles as small as 0.0005 inch and aerosols as small as 0.002 inch may be photographed. The depth of field of the camera is 200 microns. A 2,000,000-candlepower light beam is passed through the aerosol for 1-10 microseconds in order to expose the film. The particles become photographically visible due to the Tyndall effect. A piece of film can be exposed as much as 100 times in 1 second. The primary advantage derived from the use of this 500-pound camera is that it permits a study of particles in their natural condition rather than after settling.

756

1953

AIR CLEANER ASSEMBLY, 6 SIZES. Heating and Ventilating, v. 50, June 1953: 109. DLC (TH7201.H4, v. 50)

An air cleaner assembly, manufactured by the Young Radiator Co., is announced. The assembly is to be used with unit heaters employed in hot water and steam heating systems. It is recommended for use in regions where the air is highly polluted with dust, oil mist, or foreign matter.

757

1952

AIR FILTER. Heating, Piping, and Air Conditioning, July 1952, v. 24: 197-198. DLC (TH7201.H45, v. 24)

"Ultra-Aire", an air filter capable of removing air particles ranging in size from 0.05-0.1 micron has been developed by the Mine Safety Appliance Co. The air filter is better than 99.5% efficient against particles of 0.3 micron or larger.

758

1953

AIR FILTER TESTING DEVICE. Heating and Ventilating, v. 50, Feb. 1953: 122. DLC (TH7201.H4, v. 50)

An announcement is made of an accurate air filter testing device, the Dill Dust-Spot Tester. It is manufactured by Trion, Inc. and is designed to measure the efficiency of air filters on the job. The unit is used to measure the difference between dirty (non-filtered) and clean (filtered) air by collecting the dust in samples on filter paper and measuring the light transmission of the filter paper using a photoelectric device.

759

1954

AIR FILTRATION BY ACTIVATED CARBON. Heating and Air Treatment Eng., v. 17, Apr. 1954: 99-100. DLC (TH7201.A4, v. 17)

Gaseous and vaporous impurities in the air, that normally will pass freely through a dust filter, can be adsorbed effectively by use of activated carbon. To keep the carbon free from moisture and at maximum efficiency, the filters are installed on a by-pass with automatic dampers, which are operated from a gas detector unit. Regeneration of carbon filters is accomplished by steaming.

760

1955

THE AIR IS NO LONGER FREE. Chem. and Eng. News, v. 33, May 2, 1955: 1851. DLC (TP1.C35, v. 33)

In November 1953, science and industry leaders of Southern California inaugurated the Air Pollution Foundation, an independent, private fact-finding agency concerned with air pollution control. Lauren B. Hitchcock and his staff have completed three studies in which they summarize and discuss previous findings and lay out future plans concerning the meteorology of the Los Angeles basin and dealing with combustion products, incineration, and rubbish disposal. The Foundation itself undertakes no research, but prepares the ground for other organizations, and gives out contracts at an annual budget of \$750,000. The Foundation is much concerned with problems of human engineering. A motion picture, "Smog", was released in February, another, "Smog Men at Work," is under way. Measuring instruments are being improved and compared.

761

1953

AIR POLLUTION. Heating and Ventilating, v. 50, June 1953: 126-127. DLC (TH7201.H4, v. 50)

Air pollution legislation was rejected in Michigan, New York, and West Virginia. The proposed New York legislation was related to industrial control while the proposed West Virginia legislation was to have provided for a State Air Pollution Control Commission. A similar bill is pending in New Jersey. Activities of Oregon's,

Nevada's and New York City's air pollution control authorities are summarized. These activities include a tightening of controls with increased penalties for offenders. The New York City authority is expanding operations.

762

AIR POLLUTION ABATEMENT IN THE U.S.A.: CHEMICAL INDUSTRIES SET GOOD EXAMPLE. Chem. Age, v. 68, Mar. 21, 1953: 457-460.

DLC (TP1.C33, v. 68)

A review is given of the reports presented at the meeting of the 9th Air Pollution Abatement Conference, which was sponsored by the Manufacturing Chemists' Association, held in Detroit, Mich., on Feb. 26 and 27, 1953. Subjects discussed included: public relations in industry, air pollution literature, anti-pollution devices, sampling tests for possible air pollution, the role of sulphuric acid in air pollution, and efficiency of mist collection.

763

AIR POLLUTION AND CORROSION: IMPORTANT NEW TESTS SHOW CLOSE CORRELATION. Smokeless Air, v. 23, Winter 1952: 75-76, illus.

DLC (TD884.S855, v. 23)

The rates of corrosion of reference specimens of zinc and copper-steel were correlated with the pollution of the atmosphere by sulfur dioxide at 4 sites (16 exposure locations) representing various degrees of atmospheric pollution. The lead peroxide cylinders used for the sulfur dioxide determinations were changed monthly, and their sulfate content was found by analysis. The averages of the 12 monthly sulfate determinations were compared with the losses in weight of the zinc and steel specimens exposed for the whole yr. The extent of corrosion at each of the 4 types of stations is clearly shown in an accompanying diagram, but more important is the close degree of correlation of data for the 16 exposure locations, which shows conclusively that the sulfur dioxide concentration in the air is the primary factor in determining the intensity of corrosion in Great Britain.

764

AIR POLLUTION AND PROCESS INDUSTRIES. Heating and Air Treatment Eng., v. 15, Mar. 1952: 73-74.

DLC (TH7201.A4, v. 15)

Sources of air contamination and the effects of terrain and temperature inversion are briefly reviewed, and their prevention is discussed. Smoke can be reduced by dust catchers, cyclone and electrostatic separators, and washing of flue gases. The latter process causes corrosion and cools the flue gases so that they are apt to fall and cause further trouble. Other measures of combating pollution are replacement of obsolete boiler plants, heightening of chimneys, and increasing of gas outlet velocities.

765

AIR POLLUTION CONTROL. Heating and Ventilating, v. 50, Feb. 1953: 140, 144. DLC (TH7201.H4, v. 50)

A special symposium on air pollution was held at the annual meeting of the American Society of Mechanical Engineers. Special attention was given to the following items: definition of air pollution, related problems of health and nuisance, elimination and reduction of pollutants, measurement, education of industrial leaders and the public, and the use of plants as indicators of toxic pollutants. Recommendations were made to the effect that industry should assume the leadership in an attack on air pollution rather than wait for restricting legislation to be enacted.

766

AIR POLLUTION CONTROL TERMS. Amer. City, v. 72, Apr. 1957: 211. DLC (HT101.A5, v. 72)

Brief definitions are given for the following basic terms used by the Air Pollution Control District of Los Angeles, Calif.: aerosol, aldehydes, catalyst, fog, hydrocarbons, inversion, nitrogen oxides, organic acids, oxidants, ozone, photochemical reaction, smog, and sulfur dioxide.

767

AIR-POLLUTION "DRAGNET:" LOS ANGELES USES SPECIAL FORCE OF AIR POLLUTION DETECTIVES. Amer. City, v. 72, Mar. 1957: 139, illus. DLC (HT101.A5, v. 72)

The Air Pollution Control District (Los Angeles, Calif.) maintains a corps of uniformed inspectors who patrol the area in cars equipped with 2-way radios to report on air pollution. The inspectors are highly trained, generally with a degree in chemistry, engineering, physics, or metallurgy, and in addition receive special training at the District's "Smoke School" in report writing, evidence procurement, and use of the camera, a Land Polaroid, to record violations. Authority is obtained through special state legislation which is sufficiently flexible to allow the addition of new rules with changing conditions. The inspectors do not make arrests, but issue violators a copy of a notice of violation and send the original of the notice to the Investigations and Records Section, where a request for a court complaint is prepared for filing against the violator. Inspectors check commercial and industrial plants and their equipment for incorrect operation or breakdown of equipment and for outdated or expired permits. In addition they patrol highways to check on vehicular infractions and respond to nuisance complaints from individuals.

768

AIR POLLUTION IN GREAT BRITAIN FROM THE USE OF FUELS. Air Conditioning, Heating, and Ventilating, v. 54, Feb. 1957: 141. DLC (TH7201.H4, v. 54)

Estimates of damage caused in various ways by air pollution in Great Britain are given. According to a report made by the Committee on Air Pollution in 1954 the costs, which are probably on the low side, are in the region of £ 150 million a year. This figure includes only the extra cost of laundry, painting, and decorating, cleaning, and depreciation of buildings, corrosion of metals, and damage to textiles and other goods. If the costs of efficiency loss are added, the Committee estimated a total of not less than £ 250 million a year.

769

- 1955
AIR POLLUTION: IT'S INTERNATIONAL. Chem. and Eng. News, v. 33, May 2, 1955: 1850-1852.
DLC (TP1.C35, v. 33)

A type of air pollution causing extensive damage to plant life is reported within 10-20 miles around various metropolitan areas, including San Francisco, New York, Baltimore, London, etc. A direct parallel is observed between the damage to vegetation and rising levels of gasoline consumption. When fuel consumption becomes approximately 12 tons per sq mi per day in any city, plant damage is evidenced. It is estimated that 50% of unburned hydrocarbons from auto exhaust are emitted during deceleration. Devices to prevent deceleration wastes are discussed. A vacuum plunger which delays carburetor closing to idle settling to 3 sec instead of a normal $\frac{1}{2}$ sec, reportedly reduces unburnt hydrocarbons 75-90%. There is evidence that air pollution can cause lung cancer over a long period of time due to aliphatic hydrocarbons in an oxidized or polymerized state. The program of monitoring variables in the Los Angeles basin is discussed.

770

- 1958
AIR POLLUTION PROTECTION IN RUSSIA. Indus. Wastes, v. 3, Jan.-Feb. 1958: 26.
DLC

The essential features of the program of air pollution abatement in Russia are outlined. Measures taken to combat pollution include: (1) registration of industrial plants emitting noxious substances; (2) evaluation of air in cities from a viewpoint of public hygiene; (3) study of the influence on the health of inhabitants of polluted areas; and (4) enforcement of sanitary requirements for the removal of industrial wastes from the atmosphere.

771

- 1957
AIR POLLUTION RECORDER (AUTOMATIC). Instrum. Rev., v. 4, May 1957: 394.
DLC

"This instrument provides for continuous monitoring to be carried out, ... meets the requirements of the Clean Air Bill, and is in a price market which enables it to be widely used by industrial and public health authorities. Samples may be taken every 24 hr, 8 hr or 1 hr with a break of approximately 30 sec between

samples. A time mark is made on the filter paper strip at 24-hr intervals, enabling a ready check to be kept of day-to-day or hr-to-hr changes of condition. An average quantity of 5.45 cu/ft of air is passed through the instrument/hr, using a Whatman no. 1 filter paper. This figure, and also those for periods of sampling, are as on the standard model, but they may be altered to suit individual requirements. The whole instrument is housed in a metal box designed to run for long periods unattended, although the samples may, at all times, be inspected without interfering with the operation of the machine." (Quoted in full)

772

- 1957
AIR POLLUTION STUDIES AT UNIVERSITY OF CALIFORNIA. Indus. Wastes, v. 2, Sept.-Oct. 1957: 122.
DLC

A study of the combustion of liquid fuels, conducted at the University of California, revealed that liquid fuels, burned under controlled conditions, produce the same particulate organic material common to polluted atmospheres. The results are comparable to those obtained by the incomplete combustion of gaseous fuels. As a result of the work, the significance of the fuel-to-secondary-air ratio became very apparent. The production of particulate organic material becomes maximal at defined optimum ratios. This is significant in relating open burning to the type of particulate pollutant being introduced to the atmosphere. All general types of liquid fuels were represented in the experimental work.

773

- 1957
AIR PURIFICATION. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-2.
DLC

The Barnebey-Cheney Company, Columbus, Ohio, has developed activated charcoal filters for the elimination of waste gases and vapors to reduce atmospheric pollution. The activated charcoal filter cells are available in standard units which can be used singly or in multiple to handle the air or gas purification requirement. The unit handles 1,000 cu ft/min of air, has a resistance of .2 in. of water, contains 45 lbs of activated coconut shell charcoal, and occupies a space 24X24X8 inches.

774

- 1957
AIR SAMPLER. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-2.
DLC

The Mine Safety Appliance Co., Pittsburgh, Pa., has developed the "Fixt-Flo" Air sampler designed to collect large samples of aerosol contaminants of filters for weighing and analysis in connection with problems in industrial air pollution. The motor and blower of the sampler are regulated so that a regular flow rate can be maintained within $\pm 10\%$ variation. The sampler will operate at nominal flow rates of 15, 30, and 50 cu ft per minute.

- 775 **AIR STANDARDS BECOME A REALITY IN OREGON.** 1958
Indus. Wastes, v. 3, Jan.-Feb. 1958: 21-22. DLC
Sections I, II, and III of the air pollution regulations for the state of Oregon are given. Section I contains definitions of terms. Section II outlines the standards for smoke discharge for particle fall-out rate and for the admission rate of suspended particulate matter and chemical substances. Section III states that in cities or industrial communities where several sources of air contamination contribute to a downwind nuisance condition, determinations must be made of approximate percentages of the discharge from each source.
- 776 **Akerlow, E. V.,** 1957
MODIFICATION TO THE FONTANA OPEN HEARTH PRECIPITATORS. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 39-43, illus. DLC (TD883.A48, v. 7)
Dry electrostatic precipitators have been installed on the nine 225-ton open-hearth furnaces of the Kaiser Steel Corporation plant, San Bernadino County, Calif. The installations are designed to enable the gases to bypass the waste heat boiler to the stack, or to bypass both the boiler and the precipitator and go directly to the stack. The specifications, design, and modifications of the precipitators are described. The average amount of particulate matter entering the precipitator is about 160 lbs/hr. Illustrations are included.
- 777 **Alivisatos, G. P.,** 1955
A. E. Pontikakis, and B. Terzis.
TALCOSIS OF UNUSUALLY RAPID DEVELOPMENT. Brit. Jour. Indus. Med., v. 12, Jan. 1955: 43-49. DLC (RC963.A23, v. 12)
Eight cases of talcosis, occurring in mill workers after an unusually short exposure to talc, are described. It was evident that the gross pollution of the air and the small diameter of the talc particles were the main factors in the production of talcosis. Samples of air taken in the vicinity of the mills and in the transportation area showed a very high talc particle count. The chemical analysis of samples of the talc powder did not reveal the presence of free silicic acid, but the radiological appearances and clinical findings in the case studies were similar to those found in silicosis.
- 778 **Allison, A. R.,** 1952
and I. J. Stanley.
OZONE DETERIORATION OF ELASTOMERIC MATERIALS: PRELIMINARY RESULTS OF A STUDY BY INFRARED SPECTROSCOPY. Analyt. Chem., v. 24, Apr. 1952: 630-635, illus. DLC (TP1.1815, v. 24)
The work described consists of explorative studies with the ultimate objective of developing an accelerated ozone aging test for elastomers based primarily on compositional changes rather than on the conventional variation in physical characteristics. Infrared spectrographic techniques were found to be admirably suited for the reflection of accumulation or depletion of specific structural linkages in polymer molecules undergoing oxidation. Purified gum specimens of Hevea [brasiliensis], GR-S, nitrile rubber, neoprene, and GR-1 were dissolved in chlorinated hydrocarbon solvents, such as ethylene dichloride or o-dichlorobenzene, and subjected to a stream of ozonized oxygen containing approximately 50 ppm of ozone. Infrared spectrograms of films cast from the treated solutions show progressive intensification of clearly defined absorption bands at 2.9 and 5.8 millimicrons, reflecting the functional groups, hydroxyl and carbonyl, respectively. Methods for quantitating these changes by calibration against reference compounds are described. A means is available for following ozone degradation of polymers in terms of specific variations in molecular structure. Basic information of this nature is potentially useful in the development of an accelerated ozone aging test correlatable with aging under conditions of actual service. (Authors' abstract)
- 779 **Altshuler, B.,** 1957
and others.
AEROSOL DEPOSITION IN THE HUMAN RESPIRATORY TRACT. Arch. Indus. Health, v. 15, Apr. 1957: 293-303. DLC (RC963.A14, v. 15)
The experimental procedure used in measuring the extent and locus of deposition of aerosol particles in the human respiratory tract is described. Determinations are carried by continuous Tyndallometric measurements of the changing concentration of aerosol in a single expiration after inhalation of aerosols of homogeneous size and known concentration. A series of tests were performed on subjects breathing triphenyl phosphate particles of diameters ranging from 0.14 to 3.2 μ at three respiratory rates. The results for total disposition are given showing its dependence on particle size. Tables and illustrations are given.
- 780 **Amdur, M. O.,** 1954
SMOG EFFECTS. In Speed Up Cancer Research. Chem. and Eng. News, v. 32, Jan. 18, 1954: 228-229. DLC (TP1.C35, v. 32)
Reports indicate that the death rate during smog is greatest in people with asthma, chronic bronchitis, or heart disease. Experiments made in guinea-pigs to determine the smog constituents responsible for harmful effects, showed that 8 mg/m³ of H₂SO₄ mist and 89 ppm of SO₂ while not producing respiratory symptoms separately, if combined, caused dyspnea in the animals for 24-48 hours and prevented their growth. Autopsies showed very severe and extensive lung damage. The author believes that interaction of these two substances in the atmosphere may explain the lethal action of smog.

- 781
Amdur, M. O. 1954
TOXICOLOGICAL STUDIES. Publ. Health Rep., v. 69,
Aug. 1954: 724-726. DLC (RA11.B17, v. 69)

Instances of acute toxic effects of air pollution reveal that pollutant concentrations did not approximate the maximum allowable range. The greatest number of fatalities occurred in the older-age groups, particularly in persons with cardiac or bronchial conditions. This indicates that standards of concentration can be used only as a guide for levels of exposure in the case of individuals in good health. Studies are discussed which demonstrate the fallacy of establishing standards of irritant effects when both acclimated and unacclimated individuals must be considered. Experiments have shown that sulfuric acid mist produces a response similar to that of sulfur dioxide at concentrations as low as 0.3 mg.

- 782
Amdur, M. O. 1957
THE INFLUENCE OF AEROSOLS UPON THE RESPIRATORY RESPONSE OF GUINEA PIGS TO SULFUR DIOXIDE. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 149-155. DLC (RC963.A135, v. 18)

The increase in pulmonary flow resistance caused by one hour of exposure has been used to study the response of guinea pigs to sulfur dioxide alone and in combination with sulfuric acid mist and sodium chloride aerosols. The degree of response to a mixture of sulfuric acid of sub-micron particle size and sulfur dioxide was greater than could be accounted for on the basis of simple addition. This was not the case when sulfuric acid of 2.5-micron particles was used. Sub-micron aerosols of sodium chloride, inert alone, increased the response to all concentrations of sulfur dioxide studied. The potentiating effect was much greater at concentrations below 25 ppm sulfur dioxide than would have been predicted on the basis of data obtained from the higher concentrations. (Author's summary)

- 783
American Society of Mechanical Engineers. Committee on Air Pollution Controls. 1956
GUIDE TO RESEARCH IN AIR POLLUTION (COLLEGES, UNIVERSITIES AND RESEARCH INSTITUTES). Third edition. New York, October 1956. 16 p. DPH

This report is one of a series prepared by the Subcommittee on Current Projects and Trends of The American Society of Mechanical Engineers. It lists 68 organizations currently engaged in air pollution research. An index to the Guide gives alphabetically the names of the research agencies and the areas of their interest. The agencies are listed according to the type of study being undertaken: chemical and aerosol, agricultural, instrument development, engineering, meteorological, field, medical, and miscellaneous. The report of the first survey on air pollution research (Mech. Eng., v.

75, Sept. 1953: 712-714) indicated that some 37 institutions reported they were engaged in such activity; in a second report, some 45 organizations reported such activity. The increase in the number of organizations currently doing research in air pollution undoubtedly is a reflection of the tremendous interest in the field; it is planned to revise these reports each year. Unfortunately, the increase in number of organizations involved indicates further duplications in the research.

- 784
AN INSIDE JOB. Chem. and Eng. News, v. 44, Oct. 28, 1957: 48. 1957
DLC (TP1.C35, v. 35)

An undisclosed ceramic catalytic coating was sprayed on piston and cylinder heads of gasoline engines. This coating resulted in a significant decline in exhaust carbon monoxide and hydrocarbon production, particularly during acceleration and deceleration. The results obtained indicate that the catalyst may improve combustion efficiency. The catalyst is a mixture of rare earth oxides. This report, based primarily on one short-term experiment, indicates that the principle of catalytic combustion in gasoline engines should be explored further.

- 785
ANALYZER DETECTS GAS TRACES. Chem. Eng., v. 60, Jan. 1953: 210. 1953
DLC (TN1.M45, v. 60)

The "Microsensor", an instrument for detecting and measuring micro-quantities of single components in streams or atmospheres of gas or vapor is described. The device can measure changes in gas compositions on the order of 1% in concentrations as low as 1 ppm. Gases being detected must be capable of reacting with chemical reagents to produce color change on a treated paper tape. Operation of the instrument is carried out automatically in continuously repeating cycles.

- 786
ANTISEPTIC COMPOUND FOR AIR FILTERS. Heating and Ventilating, v. 50, Aug. 1953: 116. 1953
DLC (TH7201.H4, v. 50)

An antiseptic compound which is virtually odorless and has a very high germicidal potency, has been developed by the Herkimer Co. This compound is suggested for use with filter adhesives. The compound is harmless to humans.

- 787
THE ANTI-SMOG BOTTLE. Smokeless Air, v. 26, Winter 1955: 106. 1955
DLC (TD694.S835, v. 26)

During the smog in the Greater-London area in Dec. 1952, it was noted (Reports on Public Health and Medical

Subjects, no. 95, H.M.S.O.; and Smokeless Air, v. 25, Winter 1954: 101-103) that some of the prize cattle at the Smithfield Show died of respiratory diseases during the smog; however, the pigs and sheep did not. The cattle were kept in scrupulously clean quarters, while the pigs and sheep lived in more natural surroundings. It was thought possible that the alkaline ammonia gas given off from the pigs' and sheeps' litter mixed with the air to produce a beneficial effect. To test the use of ammonia as a possible means of preventing damage to human lungs caused by acid vapors, particularly during smog, the Atmospheric Pollution Section is co-operating with St. Bartholomew's Hospital in issuing a special ammonia bottle to some of the hospital's outpatients and medical staff. In order to have the proportion of ammonia exact enough to neutralize the acids, the Fuel Research Station (Gt. Brit.) has also developed a special paper to measure the acidity of the atmosphere. Warning is given against the indiscriminate use of ammonia.

788

- Arend, A. G. 1953
MEASURING THE RESIDUAL DUST CONTENT IN
CLEANED AIR. Heating and Air Treatment Eng., v.
16, Dec. 1953: 334-335. DLC (TH7201.A4, v. 16)

The method of determining the amount of dust in an air stream by the amount of light reaching a phototube is discussed. A direct indication of the number of particles per unit volume of air is shown on a meter, after the relation between current and illumination of the phototube has been established. The current is electronically amplified.

789

- [Army] Chemical Corps, Fort Detrick, Md. 1951
AEROSOL FIELD TRIALS. Excerpts from Special Report No. 142, Jan. 1951. 40 p., illus. DLC-Sci

A series of six experimental field trials were carried out with nonpathogenic organisms during September 1950. These consisted of generating bacterial aerosols at various distances offshore. The assessment was made by means of aerosol samples collected at 43 locations in adjacent shore areas. These trials were preliminary and exploratory in nature, designed to demonstrate the practicability of similar future tests. It should be noted that the equipment used to generate the test aerosols described herein was selected because of its ready availability. Two test organisms were used during this series of tests. One was the spore form of *Bacillus globigii*, a relatively persistent non-pathogenic organism with great resistance to physical and chemical damage. The other was *Serratia marcescens*, a non-pathogenic vegetative organism that approaches the other extreme insofar as ability to withstand physical and chemical damage is concerned. It was determined that effective dosages can be produced over relatively large areas for distances up to 20 miles inland provided the trial is timed to coincide with suitable meteorological conditions. It should be noted, however, that successful demonstrations of this fact were carried out only

with the spore form of *Bacillus globigii*. The results of the trials with *Serratia marcescens* were inconclusive, in that difficulty was encountered in making positive identification of the test organism after sampling. This was probably because exposure of the organism to the elements caused it to lose its ability to pigment to its usual color. (Authors' abstract)

790

- [Army] Chemical Corps, Fort Detrick, Md. 1952
AN EXPERIMENTAL STUDY OF LONG RANGE AEROSOL CLOUD TRAVEL. Excerpts from Special Report No. 162, Aug. 1952. 22 p., illus. DLC-Sci

During 1952, a series of five trials were conducted utilizing a ship which disseminated between 200 and 450 pounds of inert tracer powder (zinc cadmium sulfide) along a 105-135 nautical-mile line. This line was parallel to the coast line at distances of five to ten miles offshore. The primary objective of these trials was to test the possibility of achieving long-range aerosol cloud travel and consequent coverage of large areas at ground level under meteorological conditions in which inversions of temperature were present at low levels of the atmosphere. A network of 46 sampling stations was located. Samples were collected using the membrane filters which were then mounted on glass slides and returned for assessment of the filters by microscopic examination under ultraviolet illumination. Area coverage by dosages of greater than one particle per minute per liter was from 13,100 to 34,800 square miles. Maximum distances of cloud detection were from 150 to 435 miles. The distribution of sampling stations did not enable an evaluation of the differences in cloud travel attributable to small changes in wind direction. The variation of wind direction with height was small (20° to 30°), and the direction of movement of the aerosol cloud can be explained on the basis of surface winds. From the observed trajectories, the speed of movement of the aerosol cloud is greater than the surface wind speed but less than the gradient wind speed. Evidence indicated little lateral (crosswind) diffusion of the clouds. On three trials, varying degrees and types of precipitation occurred, and positive aerosol samples were obtained during the periods of precipitation. A proper evaluation of "washout" can be obtained only in controlled laboratory tests. The tests did not yield a conclusive quantitative comparison between area and dosage coverage by (a) dissemination and diffusion of aerosol clouds under low-level frontal inversions, and (b) diffusion in the presence of nocturnal inversions. The area covered at any time indicates that there is a definite positive correlation between the presence of the cloud at the surface and the presence of surface or low-level temperature inversions. No formulae can be determined for the prediction of area dosage coverage.

791

- [Army] Chemical Corps, Fort Detrick, Md. 1953
AN EXPERIMENTAL INVESTIGATION OF AEROSOL TRAVEL. Excerpts from Special Report No. 193, Sept. 1953. 97 p., illus. DLC-Sci

The primary objective of this test program was stated to be the determination of the effect of traverse over the sea upon an aerosol cloud of viable organisms formed at sea level under certain meteorological conditions. Studies on land were made for the purpose of establishing a basis for comparison of area coverage and cloud travel. Secondary objectives were the determination of the meteorological factors affecting the aerosol travel from sea to land, and indications of the nature of the relation between the inert tracer and the viable organisms in the aerosol. A preliminary series of 6 land trials was followed by a series of 12 sea-to-land trials in the Spring of 1953. Twenty-eight liters of a slurry containing *Serratia marcescens* (Sm) and *Bacillus globigii* (Bg) were disseminated from a test fixture at points 1/4 to 3 1/2 miles offshore. Simultaneously, but separately, a dry inert fluorescent tracer powder (zinc cadmium sulfide) was released. The main sampling lines were located on the shore line and 400 yards inland. The content of the aerosol cloud was sampled for organisms using all-glass impingers and for tracer particles using membrane filters; assessment of samples was done at a nearby field laboratory. Significant recoveries of vegetative viable organisms and sporulating organisms were obtained on shore under a moderate range of wind and atmospheric stability conditions. Detailed analyses of cloud widths and area coverages, which were obtained with this sampling and assessment system, together with time-decay of the organisms in the atmosphere, are presented and compared with results obtained on the preliminary set of land trials using identical procedures. From the land trials it was found that, for *Bacillus globigii*, the rate of decrease of recovery in relation to the downwind distance from the source of emission had followed almost identically the empirical pattern determined after field trials with gas and smoke. From the sea-to-land trials in the four trials where *Bacillus globigii* spores were disseminated, successful sampling results were obtained over relatively large areas for distances up to 20 miles inland. In the two trials using the vegetative organism *Serratia marcescens*, the sampling results were inconclusive. Large recoveries were obtained for the fluorescent tracer particles.

792

[Army] Chemical Corps, Fort Detrick, Md.
AEROSOL TRAVEL. Excerpts from Special Report No. 237, Aug. 1955. 127 p. DLC-Sci

The general purpose of this study was to evaluate the characteristics of an aerosol cloud, including depth of penetration, viability, and decay. The sampling grid was about 5 miles wide and was made up of 3 lines of sampling stations on land, the first of which ("Able") was on the beach and the second ("Baker") and third ("Charlie") along established highways about one and three miles inland respectively. Because quantitative-type data were needed to estimate the total dosage and extent of a biological aerosol on land after travel over water, two disseminators were lashed to a small craft anchored at a dissemination point about 1 mile, occasionally 2 miles, offshore. Two small craft, which were anchored between the dissemination point and the shore, carried sampling stations. The biological simulants *Serratia marcescens* (for which the symbol Sm is used

in this report), in a concentration of approximately 20×10^9 organisms per ml, and *Bacillus subtilis* var. niger (Bg), in a concentration of approximately 20×10^8 , were mixed for dissemination. Simultaneous dispersion of zinc cadmium sulfide (FP), as an inert tracer material, was made from a generator located nearby. All three simulants were collected while the aerosols passed and were taken to the laboratory for assessment. After adjustment to "total dosage" (a unit flow rate of one liter per minute), the recovery of Bg was of the order of 10^4 organisms on the Charlie line and of 10^3 on the Baker line. In the various computations, the term "cloud decay" is used as a general one including the death of organisms while still airborne, physical fallout of particles, and the effect of both vertical and horizontal diffusion. On the basis of prior information it was assumed that Bg had no loss by death of the organisms, or biological decay. It was found that, on an average, the cube of the recovery decreased proportionately with the square of the distance. A table is given showing the theoretical average decay rate in terms of cross-wind integrated dosages (CWID) and miles, to the actual data from Trial 8. Since it was assumed that other conditions were similar, the observed differences in decay rate between Sm and Bg were considered as resulting entirely from the biological death rate of Sm. Sm decay rates were estimated from the ratios of Sm to Bg at various times after dissemination. From the computations, it was found that, of the number of organisms in the Sm cloud at a given instant, on the average half of these died during the succeeding 1.9-minute interval. It was noted that these field trials occurred at midday when ultraviolet, to which Sm is extremely sensitive, was at its highest intensity. By means of the Calder-James empirical evaluation of the Sutton formulae in the meteorological appendix of this paper, the recovery was related to source strength, wind speed, downwind distance, and area coverage. Because of the great variability found, the results comparing the total decay, including diffusion, of Bg and FP, it was concluded tentatively from these trials that it was not possible to differentiate between the aerosol characteristics of these two materials either on the basis of total decay or on rate of decay. The presence of high humidity and of nuclei of sea salt brought about some problems peculiar to these tests. As an instance, the FP material was highly hygroscopic and its flow properties were seriously affected by high humidities.

793

Aßperger, S., and I. Murati. 1954
DETERMINATION OF MERCURY IN THE ATMOSPHERE. SUBMICROANALYTICAL DETERMINATION OF MERCURIC ION IN BROMINE- AND CHLORINE-WATER BASED ON ITS CATALYTIC ACTION. *Analyt. Chem.*, v. 26, Mar. 1954: 543-545.
DLC (TPI.1615, v. 36)

The reaction of potassium ferrocyanide with nitrosobenzene in aqueous solution is very strongly catalyzed by mercuric ions. The concentration of the violet reaction product $[\text{Fe}(\text{CN})_5(\text{C}_6\text{H}_5\text{NO})]^{3-}$, at a fixed reaction time depends on the concentration of mercuric ions present in the solution. Thus, it is possible to determine the

concentration of mercuric ion by means of spectrophotometric estimation of the violet product. The method is proposed for the range 5×10^{-7} to 5×10^{-6} mole/l of mercury (II) ion. In the range most favorable for analytical work (1×10^{-6} to 5×10^{-6} mole/l) the relative standard error amounts to about 9.5%. Mercury vapors from the atmosphere can be brought into solution by the action of bromine or chlorine. Since mercuric ions can be determined in distilled water as well as in bromine and chlorine water by the described method, the determination of mercury in the atmosphere can be reduced to a determination of mercuric ions. (Authors' abstract)

794

- Atherton, E., and R. H. Peters. 1953
LIGHT-SCATTERING MEASUREMENTS ON POLYDISPERSE SYSTEMS OF SPHERICAL PARTICLES. Brit. Jour. Appl. Phys., v. 4, Dec. 1953: 366-369, illus.
DLC (QC1.1548, v. 4)

Light-scattering measurements on polydisperse systems have been shown to give particle size values which may be predicted by Debye's theory. Results of light-scattering measurements were made using some commercial dispersions. Three methods were employed involving measurement of dissymmetry, turbidity, and dependence of the latter on wavelength. The distribution curves compare favorably with those employing the electron microscope. It is felt that the results indicate a useful, if approximate, extension of Debye's theory to polydisperse materials of the type encountered in industry.

795

- Atlas, D., M. Kerker, and W. Hitschfeld. 1953
SCATTERING AND ATTENUATION BY NON-SPHERICAL ATMOSPHERIC PARTICLES. Jour. Atmospheric and Terrestrial Phys., v. 3, Feb. 1953: 108-119.
DLC (QC801.J6, v. 3)

The approximate theory of Gans for electro-magnetic scattering and absorption by ellipsoids is applied to atmospheric particles. It is found that the general form and state of orientation of such particles may be determined, at least in a qualitative manner, from the backscattered radiation. Spherical particles return radiation polarized like the incident radiation. Non-spherical particles (with some exceptions) give rise to a cross-polarized component. If the particles have preferred orientations, the backscattered energy depends not only on particle shape but also on the polarization of the radiation and on its angle of incidence. This dependence is more pronounced for water (or water-coated ice) particles than for ice, while snow, on account of its low refractive index, scatters almost like spheres of equal volume, regardless of particle shape or orientation. Randomly oriented shaped particles always scatter and attenuate more strongly than equivalent spherical particles; if the particles are oriented, there may be an increase or decrease of their scattering and

attenuating powers, depending on their orientation relative to the incident beam. These results, in conjunction with Kerker, Langleben and Gunn's (1951) calculations on scattering and attenuation by water-coated ice spheres are shown to be essential constituents of the theory of the bright band (the intense radar echo received from precipitation particles in the process of melting). (Authors' abstract)

796

1953

- ATMOSPHERIC OZONE MEASURED IN WEATHER STUDY. Chem. and Eng. News, v. 31, Jan. 26, 1953: 350.
DLC (TP1.C35, v. 31)

A study has been initiated by the Oregon State College to determine correlations between ozone concentration in the upper atmosphere and the weather on the ground. The amounts of ozone vary during the year; in Oregon, and generally in the northern hemisphere, the maximum concentrations, F. G. Decker has built a double-prism instrument and plans to construct two more in order to conduct state-wide readings.

797

1957

- ATMOSPHERIC POLLUTION ABATEMENT INVOLVES DIFFUSION STUDIES, MOTOR VEHICLE EXHAUST, AND ODOR CONTROL AMONG OTHER FACTORS. (Report of papers presented at the Golden Jubilee Meeting of the Air Pollution Control Assoc., St. Louis, Mo.). Indus. Wastes, v. 2, Sept.-Oct. 1957: 119-122, illus.
DLC

A report of the conference is presented covering discussions of motor vehicle exhaust, atmospheric diffusion studies, pollutant analysis, industrial processes, odor evaluation, nuisance problems, air pollution inventory, dust and diffusion. Automatic devices in use for the analysis of atmospheric pollutants are listed. The basic steps taken by ferrous and non-ferrous foundries for the control of hot emissions are outlined. A list of sources of odors in relative importance from the standpoint of total times reported is included.

798

1956

- AUTOMOBILES AND AIR POLLUTION. Jour. Amer. Med. Assoc., v. 162, Sept. 8, 1956: 134.
DLC (R15.A48, v. 162)

In a report of the Fuel Research Station to the Royal Society of Health, England, it is pointed out that air pollution caused by automobile exhaust gases is small compared with that caused by coal combustion; however, since vehicular exhaust gases are emitted in the streets at a low level, there is little chance of their being dispersed before being inhaled. In gasoline engines, the carbon monoxide emitted is about 4%, and in diesel engines about 0.1%. Practically no benzopyrene is detected at gasoline engine loads exceeding 50%, while in efficiently run diesel engines only a trace is evident.

Yearly pollution from carbon monoxide totals 24 metric tons of which 10 tons are from industrial chimneys, 10 tons from domestic appliances, and 4 tons from automobile exhausts. The average carbon monoxide in the air of London streets in 1955 was 15 ppm. In the smog of Jan. 1956, the carbon monoxide content rose to 50 ppm in London and 80 ppm in Salford, England. Data indicate that the average pedestrian experiences an effect of carbon monoxide poisoning at a concentration of 50 ppm after exposure of 4 to 6 hr.

799

1957

- B. C. U. R. A. [BRITISH COAL UTILIZATION RESEARCH ASSOC.] REPORT. Smokeless Air, v. 28, Aut. 1957: 45. DLC (TD884.S855, v. 28)

Included in the discussion of the B. C. U. R. A. Annual Report for 1956 is the report that 70 to 80% of the sulfur is retained in the ash on burning cold-pressed briquettes containing 5% of hydrated lime, compared with 25 to 35% for briquettes without the additive. This conclusion is based on experiments with an open fire.

800

1954

- THE B. I. S. R. A. PHOTO-ELECTRIC DUST METER: CONTINUOUS RECORDER BASED ON LIGHT SCATTERING. Metallurgia, v. 49, Mar. 1954: 156. DLC (TN1.M425, v. 49)

A continuously recording instrument of atmospheric dust concentration, developed by B. I. S. R. A. and manufactured by Radiovisor Parent, Ltd., is described. The instrument comprises 4 main components: (1) the sampling chamber, in which three photo-electric cells, the light source, and an optical system are installed; (2) a thermionic valve amplifier, together with its stabilizer, power supplies, and setting up controls; (3) a 7-inch diameter indicator-relay meter incorporating a small contactor for connection to an alarm system; (4) a continuous strip recorder. This instrument works on a "light-scattering" technique. Increased light scatter, due to suspended dust particles, results in an increase in the photomultiplier current, with a corresponding deflection of the needle of the indicator meter. The equipment may be calibrated in conjunction with standard gravimetric measurements and to suit site conditions. The measurements of this device have proved consistent when tried by the British Iron and Steel Research Association. (Quoted in part)

801

- Baliff, J., and others. 1956

PANEL DISCUSSION ON EQUIPMENT AND LABORATORY NEEDS. In Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 125-133. 1956. DPH

In order to profit from the experiences of others, and to avoid duplications, it was felt necessary to standardize instruments, sampling methods, analytical methods, and methods of reporting. This uniformity would also help to put the air pollution program on a nation-wide basis and allow for better exchange of information. Some of the difficulties of operating, where there is not yet a clearly defined legal authority, and the varied problems met with in trying to work out ordinances in a large city, are discussed. The Comapp Program of Cleveland, Ohio, is mentioned, in which some 11 industrial companies and the U. S. Weather Bureau have established stations for general air sampling. This information, together with information on wind direction, wind velocity, etc., from the Weather Bureau stations, gives a good picture of the micro-meteorological situation with respect to air pollution and has led to the ability to predict the concentration of pollution 24 hours in advance. As much factual material as possible should be obtained before any equipment is decided upon. A perusal of the literature should produce information on many tested stack sampling processes, and persons who have worked in the field should be consulted about choice of equipment. It was concluded that there is a need for a bulletin describing laboratory facilities and equipment for use in air pollution control. The Public Health Bulletin No. 236, entitled "Evaluation of the Industrial Hygiene Problems of a State", which describes a typical hygiene laboratory, may be taken as a model.

802

- Ballman, H. C., and others. 1956

PANEL DISCUSSION ON BUDGETARY NEEDS. In Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 133-139. 1956. DPH

The costs of equipment, personnel, and other expenses for air pollution control programs are discussed. Many of the budgetary problems are common to all types of programs. In order to assess public demands and available means, public hearings should be held and advisory bodies should be established. Over-budgeting is as much of a problem as under-budgeting, particularly since, at the beginning of a program, it is difficult to recruit good personnel quickly and spend the money wisely. Public Law 159 does not contain a "matching-grant provision" as do many Federal Public Health acts. The current budget does not contain such funds, but it is hoped that in another fiscal year some funds can be made available. The Robert A. Taft Sanitary Engineering Center plans to publish information pertinent to air pollution, such as statistics on the number and kinds of personnel in agencies and general information to help intelligently operate programs on air pollution control.

803

- Barnebey, H. L., and W. L. Davis. 1957

DETERMINING ORGANIC VAPOR CONCENTRATIONS

IN AIR. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 86-87, illus. DLC (TD883.A48, v. 7)

A simple method is described of quantitative removal of volatile contaminants, especially organic vapors, from the air for analytical identification and measurement. Both the contaminants and the water vapor are removed by condensation using dry ice and an acetone bath. A composite sample of the contaminants obtained from the traps of the acetone-dry ice bath is analyzed chemically for the determination of the pollutant or mixture of pollutants. The concentration of vapor in the original air mixture is found by use of the formula:

$$\frac{\text{Wt. contaminants trapped (G), and the}}{2 \text{ liters/min} \times \text{time (min)}}$$

concentration is expressed in g/liter, which can be converted to lb/n³. The preparation and operation of the apparatus is described. Diagrams are included.

804

Bartelena, G. 1954
[OCCUPATIONAL DISEASES OF THE UPPER RESPIRATORY TRACT DUE TO INHALATION OF DUST AND TOXIC GASES] Lesioni professionali delle prime vie aeree per inalazione di polveri e di gas nocivi. — Bollettino delle malattie dell' orecchio, della gola, del naso (Firenze), v. 72, May-June 1954: 237-269.

DNLM

Six clinical cases are reported showing a laryngitis with ulcero-exudative or pseudo-membranous injuries to the vocal cords. The patients were employees of chemical (sulfuric acid, etc.) or industrial (cement, etc.) plants. The lesions were slow to heal, and in 2 of the cases there was a gradual transformation to a leukoplasic type of lesion. In the examination of the upper respiratory tract of 175 employees of chemical and industrial plants, it was found difficult to determine whether the slight inflammation of the laryngeal area found in some of the patients was caused by the chemical substances or by the use of tobacco or alcohol. Cases of metaplastic transformation of the mucous membrane of the nasal septum, ulceration or perforation of the septum, atrophic rhinitis, and leukoplasic areas in the larynx were found, however, which were probably related to the inhalation of chemical or dust substances.

805

Barthauer, G. L., 1953
A. Haggerty, and R. J. Friedrich.
ANALYSIS OF SYNTHESIS GAS: RAPID AND HIGHLY ACCURATE METHOD. Analyt. Chem., v. 25, Feb. 1953: 256-259, illus. DLC (TP1.1615, v. 25)

In connection with a fundamental study on coal gasification kinetics, it became necessary to develop a method for the rapid and accurate analysis of synthesis gas. Existing methods were too inaccurate, required too much time/analysis, or cost too much. By combining a variety of gravimetric combustion techniques using conventional laboratory apparatus, a method was developed which proved entirely adequate for rapidly and accurately measuring hydrogen, carbon monoxide, car-

bon dioxide, and methane in the exit gas. A slight modification of the procedure was required if the sample was contaminated by inert gases. Results on synthetic samples prepared from pure gases indicate that the method is decidedly superior to both Orsat and mass spectrographic techniques. Although limited in scope, increasing interest in synthetic fuels should permit wide application of the techniques described. (Authors' abstract, in part)

806

Basse, B. 1957
VENTURI SCRUBBERS FOR CLEANING CUPOLA GASES. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 218-220, illus. DLC (TD883.A48, v. 6)

Pilot-scale tests were performed with a Venturi scrubber for cleaning cupola gases at a large midwest plant manufacturing farm equipment. The purpose of the tests was to observe the effluent appearance, to determine if a Venturi scrubber could reduce the dust in the effluent to below the maximum allowed by local air-pollution ordinances, and to obtain the optimum operating design for a full-scale unit. It was found that the scrubber can clean cupola gases so that dust loadings are far below most local ordinance requirements. The optimum design, of course, is for a scrubber which will consume just enough power to meet the requirements. A very wide variety of these requirements can be met in a single Venturi scrubber design by varying the power supplied by the exhauster, i.e., the size and speed of the fan wheel and motor. Even when operated at relatively low pressure drops, the Venturi scrubber can meet most code requirements.

807

Beaver, Sir H. 1955
AIR POLLUTION: THE PROBLEMS OF ADMINISTRATION. (Paper presented at the Sessional Meeting of the Royal Sanitary Institute, London, Jan. 26, 1955). Roy. Sanit. Inst. Jour., v. 75, Apr. 1955: 259-263. DLC (RA421.S3, v. 75)

The author of this paper is chairman of the Government Committee on Air Pollution. The Committee envisages a new, all-embracing Act, which will consolidate all existing legislation in one workable whole. This Act should postulate the national policy of clean air. It should be very comprehensive, and must be backed by both Houses of Parliament and the combined efforts of the departments concerned. The law should be administered by the local authorities, which should receive adequate support to perform their duty. The expert arbitration of a central inspectorate, which would command complete reliance, is an essential factor for success. Since the burden of air pollution control will often exceed the capacity of many a local authority, close cooperation between neighbouring bodies is urged, which should go far beyond mere consultations. Long-term programming will be required, so that the necessary conversions of unsuitable grates

and the supply of smokeless fuel can be effected. Planning and execution must be carefully synchronized. Against the exhausts from motor vehicles and river craft, the means of securing effective control have yet to be found. In regard to locomotives, it seems that no other control is available than electrification or dieselization of the engines. It is suggested that the Royal Sanitary Institute should and could make a vitally important contribution to the whole program.

808

- Behrendt, A. 1957
GAS CLEANING IN RELATION TO OXYGEN PRE-REFINING AND THE ROTOR PROCESS AT OBERHAUSEN. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 126. DLC (TD884.S855, v. 28)

This paper describes the oxygen lancing and Rotor process in use at Oberhausen and also the experimental and final plants used to clean the gases given off. The costs of running a bag filter are given and it is shown that these are exceeded by the value of the iron content of the dust recovered. The differences between the ducts from the processes are described and reasons for them are advanced. (Quoted in full)

809

- Belyea, H. A. 1958
AIR POLLUTION: A NEW PROBLEM FOR MUNICIPAL OFFICIALS. Municipal Utilities Mag., v. 96, Feb. 1958: 19-21, 42-45, illus. DLC (TA1.M84, v. 96)

A chart is presented of 43 sources of air pollution in Metropolitan Toronto, Canada. For each source the percentages of smoke, fly ash, dust, fumes, and vapors are given and municipal air pollution and nuisance ratings are cited. A list of common contaminants is included, such as acrolein, benzol, benzopyrene, carbon dioxide, cement dust, fluorides, halogens, etc.; known effects of these contaminants on property, vegetation, and health are discussed, e.g., corrosion of metals, mortar, and building materials by sulphuric acid, paint discoloration by hydrogen sulphide, and photochemical oxidation and color-fading by ozone.

810

- BENZOLE METER. Instrum. Rev., v. 4, May 1957: 346. DLC

"The meter was designed primarily to meet the needs of benzole (benzene) producers for an instrument to indicate the efficiency of benzole recovery from coal gas. The operation of the unit depends upon the selective absorption of benzene, toluene, and xylenes of ultraviolet light at 2537Å. Briefly, the meter is a sensitive photometer in which the gas cell is interposed between a low-pressure mercury-vapor lamp (the emission of which is substantially monochromatic), and a

photoelectric detector with a quartz envelope. The photoelectric cell is arranged to unbalance a dual pentode bridge circuit when the transmission patch is influenced by the presence of benzole. The meter mounted on the front panel indicates the state of unbalance in the bridge circuit, and thus the amount of benzole in the chamber." (Quoted in full)

811

- Berghout, C. F. 1957
FIELD TECHNIQUES USED TO DETERMINE HEIGHT AND EXIT DIAMETER OF A POWER PLANT STACK. Amer. Indus. Hyg. Assoc. Quart., v. 18, Sept. 1957: 242-245. DLC (RC963.A135, v. 18)

A discussion is presented of field techniques used at a U. S. Army power plant to determine the stack height and exit diameter which would be required for the most effective dilution of effluents in the presence of building-generated turbulence. Results of experiments carried out with the use of smoke grenades to determine the turbulent zone created by the downwash of gas are discussed. Application of Sutton's equation to the power plant indicates that heightening the stacks would result in a theoretical maximum concentration of 0.03 ppm sulfur dioxide being produced at ground level at a distance of one mile, assuming the wind velocity is 10 mph.

812

- BETTER MOTOR FUEL CONSUMPTION THROUGH SMOG RELIEF PROGRAM? Petroleum Processing, v. 10, Feb. 1955: 151. DLC (TP690.A1P37, v. 10)

Researchers have determined that the hydrocarbon content of engine exhaust gases over the normal driving range, content in wt-%, averaged from 1.5% at part throttle to 4% at idling and 12.5% at deceleration. Two methods of reducing the volume of hydrocarbons during deceleration have been considered. Fuel may be shut off when the intake manifold vacuum exceeds about 21 in. of Hg. This method, when tested, gave 2.9% more fuel economy in ordinary driving. The other method calls for preventing the vacuum from reaching the values which give high concentrations of unburned fuel in the exhaust gases.

813

- Biber, M. 1955
[RESULTS OF RECORDING THE NUMBER OF CONDENSATION NUCLEI AT BASEL AND THE SURROUNDING AREA] Ergebnisse der Registrierungen der Zahl der Kondensationskerne in Basel und seiner nächsten Umgebung. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). Geofisica pura e applicata (Milano), v. 31, May-Aug. 1955: 147-161, illus. DGS
Results of recordings with the Verzar nuclei counter at Basel, Switzerland, and the influence of changes of air

masses, sunshine and precipitation on nuclei concentration are studied. In addition, the results of simultaneous recordings in the center of the city, on the outskirts, and at a nearby village are discussed thoroughly. A further comparison between Basel and Berne shows a relationship between the daily means of nuclei concentration of these two towns which are about 100 km apart. (Author's abstract, in part)

814

- Birdsall, C. M., and E. Spadinger. 1952
A. C. Jenkins, and E. Spadinger.
IODOMETRIC DETERMINATION OF OZONE. *Analyt. Chem.*, v. 24, Apr. 1952: 662-664.
DLC (TP1.1615, v. 24)

In the range of concentrations investigated (1 to 25 mole-%), the use of a 2% unbuffered aqueous solution of potassium iodide for the analytical determination of ozone gives precise results, which are accurate to 2% when compared with a physical method. The use of boric acid as a buffer is unnecessary and can lead to erroneous results. (Authors' abstract, in part)

815

- Bispham, T. 1954
THE NATURE OF THE VOLATILE MATTER IN COKE.
Jour. Inst. Fuel, v. 27, Apr. 1954: 201-208, illus.
DLC (TP315.16, v. 27)

Distillation of dried coke in vacuo at 965°C showed that the main constituents of the gas are water vapor, oxides of carbon (both carbon monoxide and carbon dioxide), and a gas corresponding to "end" coal gas, i.e., the gas evolved at the end of the carbonizing period. (Author's abstract, in part)

816

- Bleasdale, J. K. A. 1952
AIR POLLUTION AND PLANT GROWTH. *Smokeless Air*, v. 22, Summer 1952: 154-157, illus.
DLC (TD884.S855, v. 22)

A literature survey on the effect of air pollution, or of sulfur dioxide specifically, on plant growth indicates that sulfur dioxide in concentrations (i.e., below 40-50 pp 100m) not producing leaf lesions does not affect plant growth. It has been observed, however, that even without leaf lesions, air pollution does affect adversely plant growth. In recent experiments, ryegrass was grown in 2 air-conditioned greenhouses, one of which received air polluted with coal smoke and the other air from which the polluting gases had been removed. It was shown that polluted air reduces the growth of rye by about 50%. The effects of pollution on plants grown in the fields are far more severe during winter than during summer, and therefore species that are not dormant during the winter suffer more damage. Among such species are wallflower, spring cabbage, and ryegrass. Field experiments, using these

species and others, were carried out with plots located at sites receiving different levels of pollution. Photographs are presented showing the greatly retarded development of plants grown in polluted areas.

817

- Bloomfield, B. D. 1956
AN APPRAISAL OF AIR POLLUTION CONTROL INSTALLATIONS. *Amer. Indus. Hyg. Assoc. Quart.*, v. 17, Dec. 1956: 434-444, illus.
DLC (RD963.A135, v. 17)

Air pollution evaluation and control in Michigan have become functions of the Department of Health's Division of Occupational Health. Studies of air pollution problems involving the application of collection equipment which were undertaken by the Division are discussed in the field of electrical furnace production of steel, manufacture of asphalt, and super-phosphate fertilizer manufacture. It is stated that much of the air-cleaning equipment now in use has not been selected from the standpoint of the contaminant to be collected.

818

- Boelter, L. M. K. 1956
ALL PURPOSE AIR POLLUTION TEST FACILITY. In *Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems ... Sept. 20-21, 1955. p. 117-118. 1956. DPH*

Under the emergency program instituted by the Governor to study the problem of air pollution in California, a sum of money of about \$17,000 was set aside to begin a study of the feasibility of an all-purpose facility for the testing of animals, plants, materials, and humans. In such a facility, the tests could be carried out in both the actual polluted environment and in synthetic, polluted environments, so that the effects on living systems and on material can be studied under controlled conditions. A fairly large facility appears to be necessary in order that outdoor uncontrolled conditions could be simulated and controlled; where such a facility could be located is also to be decided. Other points to be considered in such a study are: the advantages and disadvantages of an all-purpose facility over a series of single-purpose facilities, the question of costs, and a means of providing the different contaminants in a uniform manner for the special-purpose test chambers.

819

- BOILER CONTROL. *Instrum. Rev.*, v. 4, Aug. 1957: 598.
DLC

"This hand-modulating boiler control front enables oil and air to be maintained in the correct proportions for efficient combustion throughout the entire operating range of the burner. The equipment is comprised of the low-pressure air burner mounted on the multivane secondary air register. Admission to the latter is controlled by a secondary air damper, linked to an oil-con-

trol valve and operated by the same hand lever. A combined valve includes the oil valve and solenoid shut-off valve which closes down the burner in the event of a flame failure, low water, or other emergency. A device is incorporated to purge all cold oil out of the system before lighting up when using heavy grade fuel oil." (Quoted in full)

820

- Bourne, H. G. 1952
CONSTRUCTION OF AN AUTOMATIC AIR SAMPLING APPARATUS. Heating and Ventilating, v. 49, Jan. 1952: 65-68. DLC (TH7201.H4, v. 49)

The device described is based on the principle of the inverted siphon. It automatically samples .0312 cu ft of air (at the rate of 0.1 cu ft/min) or 883.5 cc (at the rate of 2,831.5 cc/min), every 15 min, and is designed for use with the standard midjet impinger. The concentric siphon used in this design is thought to be more troublefree than the more common inverted-U construction. During a 21-hr continuous run, the mean deviation in sample volume for single cycles was 7 ml, and the maximum and minimum rates of flow were .105 and .093 cu ft (181.5 and 160 cc)/min, respectively. Cycle time varied from 14.87 to 15.39 min. No information is given concerning the uniformity of sampling rate during the sampling period. The device may be operated with city water pressure or with a recycling pump. (Arch. Indus. Hyg., v. 5, Apr. 1952: 409)

821

- Bourne, H. G. 1958
REPORT NEW METHOD FOR STUDYING AIR POLLUTION. Heating, Piping, and Air Conditioning, v. 30, Mar. 1958: 139-141, illus. DLC (TH7201.H45, v. 30)

The procedure used in a study of contaminants from a ferromanganese plant on the Ohio River is given. Smoke and fumes were collected 300 ft downwind from the plant using a thermal precipitator, and particle sizes were determined using an optical microscope with a 1000-X magnification. Eighty-five percent of the particles were less than 0.7 microns in size, and 15% were smaller than 0.3 microns. To collect these small-size particles, a portable electrostatic precipitator was used. Polyethylene canisters, holding 56 fluid oz and 4 in. in diam, were used to test the settling rates of airborne pollutants. At 1 to 2 miles from the plant, total dust and fumes averaged 1500 micrograms per cu m; manganese 2 to 30 micrograms; and silica 5 to 85 micrograms.

822

- Boyd, C. A., and J. C. Woosley. 1952
A SIMPLIFIED MODEL FOR DESCRIBING THE BEHAVIOR OF AEROSOL CLOUDS. Army Chemical Corps, Fort Detrick, Md. May 1952, 11 p. DLC-Sci

A simple mathematical model is constructed for the behavior of an aerosol cloud in its downwind movement from the source. The functional relationship derived is shown to involve exposure, area coverage, amount of material disseminated at the source, and certain meteorological parameters. Two examples are given of the application of this theory to results from field tests of bacterial aerosols. (Authors' summary)

823

- Bradbury, W. 1954
MECHANIZED COAL MINING AND CLEANING; EFFECT ON AIR POLLUTION. (Paper presented at the 46th Annual Convention of the Air Pollution Control Association, Baltimore, Md., May 25-28, 1953). Utilization, v. 8, May 1954: 47-50, illus. DLC (TP315.U85, v. 8)

The growth of mechanization in coal production and coal cleaning and the effect on today's problems of air pollution are discussed. If the coal and the method of burning it do not require the use of electric precipitators, then about 75% of the cost of dust collecting equipment can be eliminated. Coal preparation can play an even greater role in the prevention of smoke. For example, without proper sizing of coal it is impossible to guarantee uniform rates of combustion on grates. Properly sized coal eliminates segregation on stoker grates, thus ensuring regular primary air flow through fuel beds and proper balance of air in the furnace to prevent cracked hydrocarbons from passing up the chimney as soot and smoke. It is concluded that the contribution of coal preparation to the reduction of air pollution is in proportion to the extent to which it is applied. In general, it remains for individual consumers to choose between buying the higher priced upgraded coals or installing more elaborate and more expensive air cleaning devices.

824

- Bradley, W. R. 1956
THE AIR POLLUTION CONTROL COMMISSION PROGRAM FOR NEW JERSEY. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution"... Bulletin Series no. 83..., Sept. 1956, p. 56-59. DLC-Sci

The New Jersey legislature first recognized the problem of Air pollution in 1950 when it created a group to study it and to recommend legislation. A modified form of the original bill, which was enacted into law, is known as the Air Pollution Control Act (1954). Under its provisions an Air Pollution Control Commission was appointed by the Governor as an Agency of the State Department of Health. The Commission is empowered to promulgate and amend codes which are reasonable and necessary to air pollution in the state, and to organize county air pollution control associations. The members of the Commission serve without compensation. The State Department of Health has the responsibility of controlling air pollution in accordance with the code, and the rules, and regulations promulgated by the Commission. The author states that the New Jersey Air Pollution

Control Act under which the commission functions is the most workable and practical form of state legislation yet developed.

825

Bradley, W. R.,
and A. Crago.

1956

INDUSTRIAL APPROACH TO AIR POLLUTION PROBLEMS. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ..., Sept. 1956. p. 39-42. DLC-Sci

A general review is presented of industry's attitude concerning air pollution and its control. It is concluded that "the industrial approach to air pollution may lead in many directions, but one successful approach is as follows: (1) Determine if an air-pollution problem exists. In this connection, work closely ... with official air-pollution control agencies. (2) If you have a problem, recognize it, for air pollution cannot be concealed easily. (3) Begin control studies through stack sampling and general air sampling. (4) Using the data obtained, begin research on methods for control. (5) Apply the results of research to engineering development of control facilities. (6) Begin pilot-plant studies. (7) Install proved and tested control equipment. (8) Keep the plant neighbors informed of progress. (9) Invite the public to inspect the accomplishment and to celebrate success. (10) Inform companion industries of air-pollution control techniques which may be useful to them."

826

Bradley, W. R.,
and A. Crago.

1957

INDUSTRIAL APPROACH TO AIR POLLUTION. Indus. Wastes, v. 2, Nov.-Dec. 1957: 143-147. DLC

Land fill projects are used to dispose of trash, refuse, and waste in Neptune and Teaneck, N. J., eliminating the problems of smoke and odor formerly encountered in trash burning. Examples are given of the ammonia scrubbing process, applied to remove sulfur dioxide and sulfuric acid mist, and of the Clausius process of controlled oxidation to eliminate hydrogen sulfide gas. Dust collectors used as a means of abating air pollution are discussed. An outline of the industrial approach to air pollution, including a discussion of a public relations program, is included.

827

Brand, E. K. von.

1953

CONTINUOUS RECORD FOR AIR POLLUTION CONTROL. Air Repair, v. 2, Feb. 1953: 113. DLC (TD883.A48, v. 2)

The Socony-Vacuum Oil Co. developed a filtering recorder employing a continuously moving tape for collecting fine particles. A qualitative and quantitative interpretation of the continuous-type record is made

using other instruments. This record can be evaluated in connection with chart transcription by photoelectric, vacuum, etc. pickups from the standpoint of properties of the sampled medium. The tape can be conditioned with respect to humidity. Experimental work is now being conducted utilizing treated tape to record changes in gaseous contaminants.

828

Braverman, M. M.,
S. Hochheiser, and M. B. Jacobs.

1957

COLORIMETRIC ULTRAMICRO DETERMINATION OF PHENOL IN AIR. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 132-134, illus. DLC (RC963.A135, v. 18)

Phenols in air in the order of parts per 10 billion can be determined by the use of (1) the sensitive reagent p-aminodimethylaniline sulfate, (2) 0.5% sodium bicarbonate as an efficient trapping solution, and (3) a fritted glass bubbler as the trapping vessel. (Authors' abstract)

829

Brief, R. S.,
A. H. Rose, Jr., and D. G. Stephan.

1957

PROPERTIES AND CONTROL OF ELECTRIC-ARC STEEL FURNACE FUMES. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 220-224, illus. DLC (TD883.A48, v. 6)

An attempt has been made to assess the properties and quantities of emission from the electric-arc steel-melting furnaces, and to evaluate control systems in terms of these emission characteristics.

830

Brief, R. S.,
and P. A. Drinker.

1957

TECHNIQUE FOR COLLECTING INTEGRATED SAMPLES OF GASEOUS INDUSTRIAL EFFLUENTS. (Paper presented at the Annual Meeting of the American Industrial Hygiene Assoc., St. Louis, Mo., Apr. 25, 1957). Public Health Service. Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 12 p., illus. DLC-Sci

A technique for the determination of contaminants in gaseous effluents from both cyclic and continuous industrial operations is presented. The sampling train, made entirely of glass, is easily manipulated in the field to obtain integrated samples over periods up to 2 hrs. Standard mass spectrometric methods of analysis give results to 0.01 mole percent. (Authors' abstract)

831

- 1955
BRITAIN'S NEWEST SULPHURIC ACID PLANT. SOLWAY
CHEMICALS INVADE LONDON MARKET. Chem. Age,
v. 73, Dec. 3, 1955: 1209-1212.

DLC (TP1.C33, v. 73)

The production and operation of the Solway Chemicals plant (Albright and Wilson) is described. To prevent possible escape of acid fumes into the atmosphere, all outdoor transformers are hermetically sealed and coated with an acid-resistance paint. Ancorite acid-proof brick linings are used in all reactors, absorption or drying towers, hairpin coolers, and circulation tanks.

832

- Bronowski, J. 1952
POWER AND WASTE IN THEIR SOCIAL SETTING.
(Condensation of an address presented as the Second Des Voeux Memorial Lecture before the 1951 Blackpool Conference of the National Smoke Abatement Society, Great Britain). Air Repair, v. 1, May 1952: 17-20, illus.

DLC (TD883.A48, v. 1)

A popular lecture dealing with the general topic of improving Britain's industry in terms of modernization and better techniques is presented. Emphasis is laid upon energy and material wasted in smoke: 17 out of every 20 cwt are thrown away in smoke for every ton of coal. Smoke is the largest store of energy the country possesses. If an end is put to this waste, the country will be ready in 20 years to deal with the problem of atomic wastes. The cure is the modernized plant.

833

- 1957
BROOKE TYPE EHA SMOKE INDICATORS AND INDICATOR-RECORDER. Indus. Heating, v. 24, Aug. 1957: 1658.

DLC (TH7201.I5, v. 24)

Essentially the same as Air Pollution Bibliography, v. II, Abstract no. 1411.

834

- Brooks, S. H., 1957
and W. J. Calvert.
EXTERNAL POLLUTION FROM AN IRON AND STEEL WORKS AND MEASURES TOWARDS ITS REDUCTION.
(Abstract of a paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 125.

DLC (TD884.S855, v. 28)

Iron-ore preparation and sintering and the use of liquid fuels in O.H. furnaces, have created new problems of dust and fume emission from iron and steel works. The measures taken at Appleby-Frodingham to minimize air pollution are detailed and figures of emissions are given. Methods of making further reductions are

also considered. An attempt is made to assess the cost of pollution damage caused by the industry in general and by Appleby-Frodingham in particular, to illustrate that the economics of installing a further plant to reduce pollution must be carefully studied. (Quoted in full)

835

- Brown, J. E. 1957
REGULATORY AND LEGAL ASPECTS OF AIR POLLUTION CONTROL. (Paper presented at a Seminar on Air Pollution Sponsored by the Community Air Pollution Program. Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio). Oct. 30, 1957. 7 p. (Mimeographed copy)

DLC-Sci

The basic fundamentals discussed for the successful regulation of air pollution control are: (1) the proper delegation of authority through suitable legislation; (2) the necessity of prohibitions and requirements being designed primarily to discourage violations and promote compliance; (3) technical rules and regulations must be founded upon scientific, engineering, and, where possible, medical public health facts; and (4) the avoidance of arbitrary, oppressive regulations or unwarranted restrictions or interferences with private enterprise. Regulations must be based on operational performance standards.

836

- Brown, W. D., 1957
and L. E. Foyle.
INCINERATOR STYLES ARE CHANGING. Amer. City, v. 72, July 1957: 103-105. DLC (HT101.A5, v. 72)

Tabulated data on 29 incinerator plants in the United States are presented including furnace capacity, furnace volume in cu ft/ton., fly-ash removal equipment, and storage bin size. Incinerators seem to be in a transition stage varying in size, arrangement, and building construction. Nearly all units have expansion chambers or enlarged sections of the gas flues where a certain amount of fly ash can settle out. Some plants are constructed with water spray at this point because it is difficult to remove the fly ash by gravity alone. A waste heat boiler in the combustion chamber helps cool the gases, thus reducing their volume, slowing their velocity, and enabling more effective sedimentation of the fly ash. Designers use 2 principal methods of handling burned refuse. In one, the ash is sprayed with water and discharged immediately into trucks which haul it away. The other requires discharging ash into a water-immersed conveyor system and then transporting the cooled residue to trucks or to an ash storage silo.

837

- Burdekin, J. T., 1956
and J. G. Dawes.
THE USE OF A SIZE SELECTOR FOR DUST SAMPLING

WITH THE THERMAL PRECIPITATOR. *Brit. Jour. Indus. Med.*, v. 13, July 1956: 196-201.

DLC (RC963.A23, v. 13)

In connection with experiments concerning the relative effect of dust concentration on aerodynamic or lung-penetrating properties of the dust particles, an estimate of such relationship has been obtained by the use of a size selector. The selector works on aerodynamic principles, in conjunction with a thermal precipitator. Results are compared with those given by an unmodified thermal precipitator. The count of particles in the size range 1 to 5 μ with the standard precipitator is a satisfactory measure of the dust-cloud concentration and is not significantly different from the thermal precipitator fitted with a size selector. Diagrams and charts are included.

838

Burke, W. C. 1953
SIZE DETERMINATION OF SILICA PARTICLES COLLECTED ON MEMBRANE FILTERS. *Amer. Indus. Hyg. Assoc. Quart.*, v. 14, Dec. 1953: 299-302.
DLC (RD963.A135, v. 14)

A procedure of determining particle size in sampling airborne dusts has been developed using a turbimeter. Membrane filters, utilized for collection, are dissolved by organic solvents, e.g., a mixture of cellosolve and acetone. The volume of solvent to filter size is standardized, and the viscosity and density are determined at room temperature, 25°C. The turbimeter consists of a concentrated beam light source, a condensing lens system, a plane-sided sedimentation cell, an adjustable iris diaphragm, and a photocell for measuring the transmitted light. "The output of the photocell is fed to either a microammeter or a Brown recorder. The calculations of particle size distribution are done by graphical methods. A sample calculation is given."

839

Bykowski, L. 1958
SMOKE AND SOOT PROBLEM AT SCRAP METAL REFINERY. *Indus. Wastes*, v. 3, Mar.-Apr., 1958: 38-41, illus. DLC

A gas scrubber, known as a Type-A Hydro-Precipitator Scrubber, has been designed to remove low and submicron solids from exhaust gases. The scrubber has eliminated the smoke and soot problem in a Jersey City (N.J.) scrap metal refinery. The unit contains a plenum chamber, a multiple-tube section, two water tanks built underneath the housing, a dewatering filter, and an exhaust fan mounted on top of the housing. The scrubber is capable of scrubbing gases discharged at more than 20,000 cu ft/min. The water used to cool the furnace transformer is circulated by means of a pump to the spray headers in the plenum chamber, where the entrained solids are wetted and velocities reduced. The gases are compressed at high velocities through precipitator tubes which extend below the water surface of the reservoir, where solid material settles to the bottom of the tank.

840

Byrd, J. F. 1957
DEMONSTRATION:SYRINGE ODOR MEASUREMENT TECHNIQUE. *Jour. Air Pollut. Control Assoc.*, v. 7, May 1957: 58-59. DLC (TD883.A48, v. 7)

Standard medical syringes are used in odor concentration determinations for diluting the odorous material with a measurable quantity of clean air. Samples of air are taken from ducts or stacks and taken to an odor-free room where clean air is available to make dilutions. Odor magnitudes of 9:1, 99:1 and 999:1 are used to determine the threshold level. A panel of observers is used to attain the test results. If the observer cannot smell the 9:1 dilution the odor level is less than 10 odor units/ft³, and further dilution in the lower range will be made to determine the threshold level.

841

Cadle, R. D., 1956
and P. L. Magill.
CHEMISTRY OF CONTAMINATED ATMOSPHERES. In *Air Pollution Handbook*, New York, McGraw-Hill Book Co., Inc. 1956. Section 3, p. 3-1 to 3-27, illus. DLC (TD883.M35)

The chemical constituents of the troposphere and their effects on polluted atmospheres are discussed. Topics of discussion include: (1) The earth's natural atmosphere, e.g., oxygen, carbon dioxide, ozone; (2) aerosols, e.g., general properties, condensation nuclei; (3) gaseous impurities; and (4) chemical reactions in contaminated atmospheres, e.g., reactions of oxides of nitrogen, aldehydes, etc., and reactions of ozone with unsaturated hydrocarbons. Formulas and charts are included.

842

Cadle, R. D., 1956
and others.
SAMPLING PROCEDURES. In *Air Pollution Handbook* New York, McGraw-Hill Book Co., Inc., 1956. Section 10, p. 10-1 to 10-52, illus. DLC (TD883.M35)

Sampling procedures used in the solution of air pollution problems are of 3 general types: air sampling, vegetation and soil-sampling, and animal sampling. These are discussed in detail including the purpose and requirements of sampling, types of sampling, sampling equipment, sampling patterns, sampling procedure, statistical considerations, etc. A comparative study of sampling devices is outlined.

843

[Cameron, J. R., 1956
L. F. Garber, K. M. Mason, J. S. Sharrah, F. M. Stead, and M. C. Wukasz.]
PANEL DISCUSSION ON PERSONNEL NEEDS. In *Public Health Service (U. S.). Robert A. Taft Sanitary*

Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems ... Sept. 20-21, 1955. p. 118-125. 1956. DPH

An informal panel discussion was held on the question of personnel needs in terms of numbers, qualifications, and training, how these personnel needs are to be met, and what the needs are going to be in setting up air pollution control programs at the state level. The question as to whether the administration of the program should be placed under an existing department, such as the State Health Agency, or whether a new agency should be set up, was answered in favor of the former solution. Laboratories should be available at the rate of one laboratory per field worker, instead of the one to two ratio customary in food and drug work, water work, and sewage work. Mention is made of the successful use of the so-called middle-aged employee who originally had undergone training as a chemist or engineer. There was further discussion of areas and their needs for trained personnel.

844

CAN WE REDUCE AUTO EXHAUSTS AS A SOURCE OF AIR POLLUTANTS? Petroleum Processing, v. 10, May 1955: 607-608. DLC (TP690.A1P37, v. 10)

The Automobile Manufacturers Association is cooperating with the Los Angeles Air Pollution Foundation (Calif.) in smog studies related to automobile exhaust gases. One of the exhaust devices tested, the Houdry catalytic converter, eliminated an estimated 80% of the hydrocarbons in automobile exhaust gases. It is reported that the Southwest Research Institute at San Antonio, Tex., has scheduled a comprehensive testing of the catalytic converter.

845

Cappel, R. L., and K. D. Mills. 1955. FEASIBILITY OF CONTROL METHODS FOR AUTOMOBILE EXHAUST. Air Pollution Foundation, Los Angeles, Calif. Technical Report no. 21 (v. 1. no. 10), Aug. 1955. 62 p. DLC-Sci

Technical, economic, and time factors regarding proposed solutions to automotive exhaust contributions to atmospheric pollution are discussed. In this review, the alternate fuels considered were liquefied petroleum gas, alcohol and alcohol/gasoline blends, and unleaded gasoline. The systems discussed for treating exhaust emissions were catalytic exhaust converters, afterburners, absorbers, condensers, and filters. Systems studied which modify engine operating conditions included manifold vacuum control, throttle dashpot, deceleration fuel cutoff, ignition-timing control, recycling of exhaust gases, fuel injection, improved maintenance practices, and design changes in intake manifolds, and carburetors. Tables and figures are included in the analysis.

846

CARBON TETRACHLORIDE. U. S. Air Force Med. Service Digest, v. 3 (4), 1952: 10. DNLN

Carbon tetrachloride is potentially toxic after inhalation, contact with the skin or mucous membranes, or oral ingestion. Poisoning may result from a single brief exposure to a high vapor concentration or from repeated exposures to lower concentrations. The maximum safe amount of carbon tetrachloride vapor in the air is 50 ppm (or 0.005% by volume). Such a concentration is produced by the evaporation of only 5.5 ml of the solvent into a room 100 ft square and 10 ft high. Two case histories of carbon tetrachloride poisoning are reported, and US Air Force regulations curbing the use of the substance are cited.

847

Carter, J. H. 1956. FUEL REGULATIONS. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution problems ... Sept. 20-21, 1955. p. 66-71. 1956. DPH

One major way to control smoke emission from various residential and commercial heating units is the regulation of the type of coal which may be burned in the area. St. Louis passed an anti-smoke ordinance in 1940. Legislation was subsequently adopted by several localities, including Pittsburgh, Cincinnati, Allegheny County, and many others. Restrictions on solid fuel, imposed by ordinance, for use in St. Louis are as follows: "High-volatile coals must be in sizes which will pass through a 2-inch circular opening and must be washed to the point where their ash content will not exceed 12 percent on a dry basis. Such fuel may be used only in mechanical fuel burning equipment. Low-volatile fuels, i.e., those containing not more than 23 percent volatile matter on a dry basis, are required for hand firing." The various methods employed for enforcing the regulations are described. The St. Louis ordinance of 1940, and most of the ordinances adopted by other localities in the following years, have contained clauses which would permit the city to buy and distribute coal on its own account in case of inability of the regularly established channels of trade in the city to provide an adequate supply of smokeless solid fuel at a price commensurate with its value. It has never been necessary to put this clause into operation in St. Louis nor in other cities as far as the author knows.

848

CATALYST BURNS ORGANIC VAPORS. Chem. Eng., v. 59, June 1952: 266, 268. DLC (TNI.M45, v. 59)

At the Enamelstrip Corporation's (Allentown, Pa.) four enamel baking ovens, batteries of the Houdry catalytic oxidizing unit have been placed in each of the stacks venting fumes. This first industrial installation of the units has been reported by the Pennsylvania Department of Health to be 93-100 percent efficient in elim-

inating troublesome pollution and odor. A second industrial installation is being made for the Sun Oil Company at Marcus Hook, Pa., and others are being planned. The units had previously been used on handling trucks in industrial plants to convert carbon monoxide to carbon dioxide. Since metal vapors from leaded gasoline poison the catalyst, the units can be used only when the engines are using unleaded gasoline. Each catalytic unit is made up of two thick porcelain end plates, a spacer bar of porcelain and 73 coated porcelain rods. The catalytic coating consists of a very thin film of catalytic alumina and platinum alloy applied by a special process. The units are assembled in the venting stack in brick-wall fashion. The four batteries in the Enamelstrip Corporation's stacks have a total of 918 units; the installation cost was about \$16,000 with the units costing about \$13,000. It is expected that the installation will pay for itself in six months. The heat recovered through the catalysts brings about a saving of 90 percent of the gas costs of \$3,000 a month; output has been increased more than 40 percent because of the heat now available from the units.

849

1953

CATALYST CAN END SOME POLLUTION PROBLEMS.

Canad. Chem. Processing, v. 37, Aug. 1953: 48, 50, illus.
DLC (TP1.C2, v. 37)

Effective use of a new catalyst, known as Oxycat, was demonstrated in its role of removing objectionable fumes from a coffee-roasting oven when a bed of the Oxycats was installed in the exhaust stack of one of the several ovens. The catalytic coating of alumina and platinum alloy on the surface of the Oxycat rods permits combustion of coffee fumes at a temperature of 500-550° F, a temperature much lower than that needed for direct flame incineration. It was estimated that the gas required for incineration of the fumes would be about half that needed to roast the coffee itself, the cost of gas for a catalytic installation being only about half that for incineration. The catalyst has been successfully used in control of odors from a petroleum refinery and from a metal-finishing plant as well. In the latter installation, a bed of Oxycats, in oxidizing noxious solvent fumes, generated enough heat energy to supply 90% of the plant fuel needs.

850

Cate, F. L. 1953
DESIGN OF CHIMNEYS FOR ODOR DISPERSION.

Tappl, v. 36, May 1953: 225-228.
DLC (TS1080.T3, v. 36)

A theory has been developed that, at a distance of ten times the chimney height, smoke concentration at ground level reaches a maximum. Concentration at that maximum varies inversely with the square of the chimney height; however, at distances greater than 50 chimney heights the concentration varies inversely with the square of the distance and is independent of the chimney height. This tends to show that by doubling the chimney height, the maximum ground concentration could be materially reduced. However, regardless of height,

some distant place will at some time be affected by the contamination being discharged. There are various better means of eliminating odors and contaminants than by depending on a chimney of a certain height. Collectors of various types, both mechanical and electrical, if properly applied, will eliminate to a great extent many injurious contaminants. (Author's abstract in part)

851

Cember, H., 1953

T. Hatch, and J. A. Watson.
DUST SAMPLING WITH A ROTATING THERMAL PRECIPITATOR. Amer. Indus. Hyg. Assoc. Quart., v. 14, Sept. 1953: 191-194. DLC (RD963.A135, v. 14)

A dust sampling device is described. The thermally-precipitated dust particles are collected on a rotating plate which provides for a random distribution of the particles with respect to size. Diagrams and formulas for determining dust concentrations are given.

852

Cember, H., 1954

T. F. Hatch, J. A. Watson, and T. B. Grucci.
PULMONARY PENETRATION OF PARTICLES ADMINISTERED BY INTRATRACHEAL INSUFFLATION. Arch. Indus. Hyg. and Occupat. Med., v. 10, Aug. 1954: 124-129, illus. DLC (RC963.A14, v. 10)

A suspension containing radioactive barium sulfate was introduced through the pharynx directly into the trachea of rats. The mean particle size of the suspension has been shown to be in the optimum size range for deep pulmonary retention. Autoradiographs made later from lung sections to study the penetration and distribution of the particles, showed them to be distributed in irregularly shaped areas throughout all parts of the lungs, and that about 40% of all the material inside the syringe was deposited in the deep respiratory tract. This method of intratracheal insufflation may therefore be considered for the investigation of particulate matter in the lungs. (Authors' abstract in part)

853

1953
CENTRIFUGING SOLIDS FROM AIR. Chem. Eng., v. 60, Sept. 1953: 256. DLC (TN1.M45, v. 60)

The Air Centrifuge removes solid material from air or gas continuously by a centrifugal rotor without the use of filters, screens, water, or electrostatic charges. The unit is adaptable to all air flow process systems. The dust removal efficiency is high on small particles. Dust laden air enters the machine tangentially at relatively high velocity and is accelerated by the rotation of the perforated rotor. During acceleration some of the solids are thrown against the chamber wall by centrifugal force. The solids drop to the bottom of the housing and are swept into the solids outlet. The unit requires no cleaning and runs continuously.

854

- Chambers, L. A. 1955
THE LONG RANGE EFFECT OF INDUSTRIAL AIR POLLUTION ON THE PURITY OF AIR MASSES NATION-WIDE: IS THE MASS SELF-CLEANING?
 (Paper presented at the Industrial Section of the Texas Water and Sewage Works Association's Short School, Mar. 7-9, 1955). Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 142-143, 184-185.

DLC (TD883.A48, v. 5)
 The analogies between the problems of air pollution and surface-water pollution are discussed. Concerning air pollution, the answer is yes to the question of whether air masses are self-cleaning, but how much of the waste products of man's activities the air can accommodate is not as easily answered. As in the case of water pollution, use of detailed information of the local patterns of stream flow, stratification, and stagnation can help in eliminating concentrations of objectionable or dangerous air pollutants, thus resulting in air pollution control.

855

- Chambers, L. A. 1956
AIR POLLUTION RESEARCH. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems ... Sept. 20-21, 1955. p. 21-26. 1956. DPH

Research has been carried out in the field of air pollution for at least fifty years at different levels of disciplinary competence and with various objectives. However, it is to be regretted that in the accumulation of a large mass of publications there has been a lack of new data and observations and too great a reliance on secondary studies, quotations, and repetitions of the same information. The air pollution research program of the Sanitary Engineering Center has, from the very beginning, been carried out on a nation-wide basis to obtain comparative data of available resources. Air pollution can no longer be regarded as a strictly localized phenomenon although it still has major localized aspects. The effective investigation of most such problems of the future will require a close coordination of research at all levels -- local, state, and federal -- among all the agencies involved.

856

- Charsha, R. C., and A. L. Linch. 1957
"FREON" POWERED PORTABLE AIR SAMPLING KIT. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 135-138, illus. DLC (RC963.A135, v. 18)

A compact air sample collecting assembly weighing less than 2 lbs is powered by vaporization and the expansion of nontoxic nonflammable "Freon" from a disposable container through a micro-aspirator. A limiting orifice in the "Freon" gas stream is employed in the place of space-consuming metering devices to determine sample volume from a time-temperature re-

lation calibration chart. One pound of "Freon" will aspirate 7 to 10 cu ft of air through a midget impinger, or filter. (Authors' abstract)

857

- Chass, R. L., and E. S. Feldman. 1952
INCINERATION OF WOOD WASTE IN THE LOS ANGELES AREA. Air Repair, v. 1, May 1952: 54-61, illus. DLC (TD883.A48, v. 1)

The temperature inversion layer prevailing 260 days a year in the Los Angeles area is quite resistant to turbulence and acts as a lid to hold pollution to the ground, resulting in smog. An Air Pollution Control District has been established in 1947; its principal means of enforcement is through a system of issuing permits. Rules 51 to 54 of this regulation are quoted. --- A substantial amount of air contaminants originates in waste burning of all types. No less than 36% of the particles emitted are smaller than 10 microns (invisible) and remain in the air for days; particles of 10-20 microns also remain a long time. However, 35% of the particulate matter is now being collected at the source. Information obtained on the sources of air pollution lists 28 categories of industries. The study is still incomplete; for example, it does not show the amount of hydrocarbon or gas losses. Great improvements have been made; air pollution was reduced by 50% in the industrial and municipal incineration category, in other categories by 17-32%; sulfur dioxide emissions have been reduced by 77%. Wood waste combustion, silo-type incinerators, and their operating techniques, are discussed in detail. Tests have shown that for each ton of material burned an average of 20 pounds is lost to the atmosphere. The authors have published standards of operating procedures for silo-type incinerators, including 15 rules for good operation, which maximize the conditions for complete combustion. Eight principles for design of multi-chambered incinerators are given.

858

- 1953
CHEMICAL LABORATORY TAKES CARE NOT TO OFFEND. Heating and Ventilating, v. 50, Nov. 1953: 73. DLC (TH7201.H4, v. 50)

The Stauffer Chemical Co. of Chauncey, N. Y., solved its problem relative to air pollution of the surrounding community by passing air from its laboratories through a bank of cell-type, activated-carbon filters before it was allowed to reach the atmosphere. The laboratory is engaged in research relative to the development of agricultural chemicals and fertilizers. Mercaptans, hydrogen sulfides, and other odorous compounds are frequently produced in the laboratories.

859

- 1952
CHEMICAL "SMELLS." Chem. Age, v. 66, Mar. 22, 1952: 431. DLC (TP1.C33, v. 66)

Announcement is made that testing equipment, which collects and concentrates air mixtures of odor-producing chemicals, has been designed at the Franklin Institute of Philadelphia. A condenser using liquid nitrogen allows the cooling of the noxious air to 300°F. below zero. The resulting liquid is then analyzed by an infrared spectrometer, and comparisons are made with the similar analyses of known quantities of the common air pollutants. The suggestion that the availability of testing equipment of this nature will make anti-odor legislation possible is dismissed as a dubious claim since the instrument still does not measure "smell".

Chirica, J. J. 1952
RECONDITIONING STEEL DRUMS VIA INCINERATOR.
Air Repair, v. 1, Feb. 1952: 43-44.
DLC (TD883.A48, v. 1)

A gas-fired incinerator has been designed for use in reconditioning steel drums and barrels. Renovation of these drums had been accomplished previously by spraying them with crude oil, kerosene, etc., and then igniting. In order to meet smoke control ordinances, a gas-fired incinerator was built. Essentially it consists of a conveyor, a combustion chamber, an afterburner, and a high stack. A smokeless effluent is attained by subjecting the unburned products of combustion in the combustion chamber to the action of the afterburner located in the base of the stack.

[Chick, D. J., and C. A. Siegler] 1957
TRACER MONITOR GASES. Chem. and Eng. News, v. 35, Dec. 16, 1957: 87, 100.
DLC (TP1.C35, v. 35)

It is announced that Tracerlab is developing a gas monitor which uses a gas-solid exchange reaction to produce radioactive effluent gas. Sulfur dioxide, as an example of a gas which may be measured by this system, reacts with a radioactive solid, sodium chlorate, to yield chlorine dioxide. The beta particles from the Chlorine-36 in the effluent gas can be detected by a Geiger counter or by scintillation methods. Amounts of sulfur dioxide as low as 0.33 ppm or as high as 33 ppm can be measured; the over-all error in the system is ±3%. Strong acids, such as hydrochloric, which affect the reaction, can be absorbed preferentially from the air stream ahead of the monitor; a prefilter removes solid particles. A cell of activated carbon removes the radioactive gases, the spent cells being disposed of by Tracerlab. The instrument, which is expected to be especially applicable to air pollution and process control studies, is still in the research stage with a prototype commercial model in the process of construction. It is expected that the final model will be portable -- small, compact, and weighing about 20 pounds -- with the cost in the neighborhood of \$1500 for the complete measuring system. Replacement reactor cells containing 100 to 150 microcuries of Chlorine-36 would cost about \$250.

862

1957
CHLORINE DETECTOR. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-3.
DLC

An instrument designed by Wallace & Tiernan Inc., Belleville, N. J., for detecting chlorine gas in atmosphere is described. The detector monitors a continuous controlled sample of air, warning when chlorine concentrations in the air exceed 3 ppm. The detector is electrically operated with alarm signals resulting from the reaction of chlorine gas with a chemically treated dry paper. The unit is made from either wall or panel mounting and can be used when chlorine is used or stored.

863

Cholak, J. 1956
ANALYTICAL METHODS. In Air Pollution Handbook, New York, McGraw-Hill Book Co., Inc., 1956. Section 11, p. 11-1 to 11-42.
DLC (TD883.M35)

An outlined summary and a discussion of analytic methods used in studying atmospheric pollutants are given. Chemical procedures are divided into gravimetry, volumetry, oxidation and reduction, colorimetry, turbidimetry, and chromatography. Instrumental methods considered cover spectroscopy, spectrophotometry, x-ray diffraction, mass spectrometry, polarography, microscopy, interferometry, thermal conductivity, radioactivity, and continuous recorders. It is pointed out that biological analysis includes 2 kinds: effects on vegetation and animals, and sensory responses.

864

Cholak, J. 1957
L. J. Schafer, D. Yeager, and W. J. Younker.
GASEOUS CONTAMINANTS IN THE ATMOSPHERE.
Arch. Indus. Health, v. 15, Mar. 1957: 198-206.
DLC (RC963.A14, v. 15)

The results of tests determining the concentrations of oxidants, sulfur dioxide, nitrogen dioxide, and carbon monoxide collected at one Cincinnati, Ohio, station are given. The concentration of sulfur dioxide was lowest during the summer months when the combustion of fuel was at a minimum. The concentration of oxidants in Cincinnati ranged between 0.2 ppm and 6 ppm and varied inversely with the concentration of sulfur dioxide present. The levels of concentration of nitrogen dioxide ranged from 0.2 to 9.9 ppm and varied inversely to the concentration of the oxidants. The concentration of carbon monoxide remained near the same level (below 1 ppm) for all three seasons of the year. Tests indicate carbon monoxide is not involved in the mechanism of the production of oxidants.

865

- Clark, G. L.,
W. F. Loranger, and S. J. Bodnar. 1954
X-RAY ANALYSIS OF FOUNDRY DUSTS FOR QUARTZ
AND IRON IN RELATION TO SILICOSIS AND SIDERO-
SIS: DIFFRACTION ANALYSIS FOR SILICA. *Analyt.*
Chem., v. 26, Sept. 1954: 1413-1416, illus.
DLC (TP1.1615, v. 26)

The quantitative x-ray diffraction analysis of industrial dusts, especially for α -quartz which is responsible for silicosis, and x-ray fluorescent-spectral analysis for iron are proved to be of immediate practical value in the study of the dust hazards and ventilation efficiencies in every part of a large steel foundry. The original x-ray diffraction method of Clark and Reynolds is improved and adapted to 2 different recording Geiger diffractometers with a linear proportionality between quartz concentration and corrected intensity ratios in each case. Two sets of dust samples collected a year apart were analyzed. The fluorescent-spectral analysis for iron in the dusts is proved to be far more reliable and convenient than chemical analyses. It is significant that in this investigation x-rays were used in 3 different ways -- for diffraction analysis of a crystalline constituent, for spectral analysis of a noncrystalline constituent, and for radiographic diagnosis of pneumoconiosis. The typical results demonstrate that entire industrial plants may be systematically and rapidly surveyed for dust hazards by parallel analyses and radiographic indications. (Authors' abstract)

866

- CLAY FLUES VENT ACID FUMES. Heating, Piping, and
Air Conditioning, v. 25, Oct. 1953: 82, illus.
DLC (TH7201.H45, v. 25)

The Allen-Bradley Co. factory in Milwaukee has installed a unique clay flue venting system to carry away acid fumes. This system consists of 5000 ft of 18-inch square clay flue liners, contained in 25 hollow concrete columns that comprise the supporting framework of the building, 3 flues in each column. Clay flue lining is resistant to the action of hot or cold, moist or acid, fumes. The fumes are vented into the upper atmosphere for harmless dispersal. They originate from quenching oils used in heat treating, from the furnace exhaust gases, from silver brazing flux, from volatile metallic oxides, from molding operations, and from degreaser fluids.

867

- A CLEAN AIR ACT. *Jour. Amer. Med. Assoc.*, v. 157,
Jan. 8, 1955: 164. DLC (R15.A48, v. 157)

The report and recommendations of the Committee on Air Pollution (Gt. Brit.) are reviewed. It is stated that there is a definite relationship between pollution and the incidence of bronchitis and other respiratory diseases. In 1951, the male death rate/100,000 from bronchitis was 107.9 in England and Wales compared to 5 in Sweden. Mention is made that nearly half the smoke in

air comes from domestic chimneys and can be controlled only by the replacement of house coal by smokeless fuels, electricity, or gas. It is suggested that local authorities encourage the use of nonsmoke-producing heating.

868

- THE CLEAN AIR ACT BEGINS TO OPERATE. *Smokeless*
Air, v. 27, Spring 1957: 161-164.
DLC (TD884.S855, v. 27)

A number of the provisions of the Clean Air Act, 1956, have come into force. The sections of this Act now in operation are listed as follows: Density meters; new furnaces to be as far as practicable smokeless; height of chimneys; smoke control areas; special cases; colliery spoilbanks; research exemptions; Crown premises; Clean Air Council; building bylaws; research and publicity; disclosure of information; and penalties. The sections on the building bylaws, smoke control areas, and authorized fuel regulations are treated briefly.

869

- CLEANUP AT THE COKE OVENS. *Steel*, v. 136, Apr. 18,
1955: 112, illus. DLC (TS300.I745, v. 136)

A brief description is presented of the measures taken to control smoke emission during oven recharging at a coke plant. Before 2 specially built larry cars were used to combat pollution, fume clouds were created for about 4 minutes when 12.5-ton charges of powdered coal were dumped into the white-hot ovens, setting up an ignition reaction. In the new system, "sleeves fit tightly over the covers during charging, and a steam jet aspirator in the ascension pipe creates a vacuum which pulls fumes into the collector mains. Since coal piling in the center of the oven might choke off this draft, all 4 coal hoppers on the larry car are connected into the aspirator system. This prevents smoke and fumes from backing up through the sleeves and out of the hoppers. The tight-fitting sleeves also eliminate most of the coal spillage around the charging hole.... Ports used to be open during the entire 4-minute cycle, but now they are open only about 80 sec." A photograph shows the apparatus used, including the charging-hole sleeve and the smoke collector.

870

- Cleaves, J. C. 1952
GRIT AND DUST COLLECTION. *Smokeless Air*, v. 22,
Summer 1952: 173-178. DLC (TD884.S855, v. 22)

The ideal dust collector, embodying the essentials of high efficiency, low resistance to gas flow, small space requirements, small capital outlay, and low operating and maintenance costs, does not exist. Therefore, the design of a dust collector for a specific application is usually a compromise. The advantages and disadvantages of various types of installations are discussed.

These include: (1) settling chambers; (2) those depending on impingement, i.e., gas washers; (3) filters; (4) electrostatic precipitators; and (5) collectors operating by centrifugal action.

371

1952

CLEVELAND INDUSTRY AND SMOKE CONTROL. *Air Repair*, v. 2, Aug. 1952: 10-11. DLC (TD883.A48, v. 2)

Cleveland, Ohio, has greatly reduced its air pollution through the cooperation of industries in abatement efforts. Cited are instances of installations of control devices and modern combustion equipment in chemical plants, foundries, refineries, and other industrial plants. As a result, in 1950, there was a 50% drop in the number of pollution-emitting industrial plants.

872

1953

COAL-PARTIAL-COMBUSTION PROCESS REDUCES SOOT AND SMOKE. *Chem. and Eng. News*, v. 31, June 1953: 2305. DLC (TP1.C35, v. 31)

E. I. du Pont de Nemours and Co., in Belle, W. Va., has developed a process of converting coal into synthesis gases in an effort to help solve the air pollution problem. Low-fusion-ash coal is pulverized in steam-driven jets and the powdered coal blown into a ceramic-lined furnace. Some of the resulting CO is used in the manufacture of ethylene glycol etc., the rest reacts with steam to give CO₂ and H₂. Hydrogen and nitrogen (the latter obtained in a separate process) are used to make ammonia. Most of the ash is drawn off as slag; the light-weight particles are caught in a filter. Portions of Belle's gas-generating equipment are being replaced by a coal-partial-combustion unit. If the rate of production turns out to be satisfactory, all of the plant's coke ovens and generators will be replaced, thus putting an end to smoke and soot. A 2.3 million dollars fly-ash abatement installation in the boiler house will be completed in 1954.

873

1956

Collins, J. C. STATE-MUNICIPAL RELATIONS. In *Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems...* Sept. 20-21, 1955. p. 94-98. 1956. DPH

With the enactment of a new comprehensive air pollution control law last year, Massachusetts became one of the few States to have such a law with enforcement at the state level. Because of inadequacy of legislation to control pollution of the atmosphere, especially since there was in the existing legislation no standard used to determine the density of smoke, the Joint Legislative Committee on Public Health directed the State Health Department to draft a comprehensive law, placing jurisdiction under the State Health Department. The law is known as Chapter 672 of the Acts of 1954, and

has been in effect since September 9, 1954. Under the new law, the Department is authorized to establish minimum rules and regulations to prevent and control air pollution within the state. After a public hearing, the rules and regulations are formulated, and, following approval by the Governor and Council, have the force of law. Fines of not less than \$10, or more than \$100 for each succeeding offense, have been authorized; the use or occupation of the premises may be prohibited until the rules and regulations have been complied with. Because there was no appropriation for personnel or equipment at the last session of the Legislature, it has not been possible for the Department to comply with requests from cities and towns for the setting up of rules and regulations. A blanket set of regulations would completely defeat the purpose since the atmospheric pollution of each localized area is unique, depending on the amount and type of pollution and the capabilities of dispersion in the area.

874

1957

Commings, B. T., R. E. Waller, and P. J. Lawther. AIR POLLUTION IN DIESEL BUS GARAGES. *Brit. Jour. Indus. Med.*, v. 14, Oct. 1957: 232-239. DLC (RC963.A23, v. 14)

The results of determinations of smoke, polycyclic hydrocarbons, nitrogen dioxide, aldehydes, carbon monoxide, and sulfur dioxide from air pollution studies made in two London diesel bus garages are given. These results are compared with analyses of the outside air. Despite large differences in the concentrations of smoke inside and outside each garage, only small differences in the amounts of 3,4-benzopyrene were noted. Concentrations of nitrogen dioxide and aldehydes did not reach the threshold limit values for eight-hour shift exposures. The carbon monoxide concentrations were negligible and there was no evidence of abnormal concentrations of sulfur dioxide. Tables are included.

875

1953

COMPACT AIR SAMPLER. *Heating and Ventilating*, v. 50, Mar. 1953: 120. DLC (TH7201.H4, v. 50)

An announcement is made of a portable device for the collection of atmospheric samples of gases, vapors, and dusts. The unit manufactured by Compact Air Samplers, contains scrubbers, air pumps and other equipment used for taking air samples. The sampler weighs eleven pounds. It can be used for room or stack sampling.

876

1953

COMPLAINTS AGAINST CHEMICAL WORKS. ALKALI INSPECTORS REPORT ANOTHER BUSY YEAR. *Chem. Age*, v. 69, Aug. 8, 1953: 275-278. DLC (TP1.C33, v. 69)

The following defects in the equipment of chemical plants are listed in the 89th Annual Report on Alkali etc. Works for 1952 (by the Chief Inspector, Great Britain), and methods of improvement are indicated: Dust deposition detrimental to plants was traced to a defect near the bag filters attached to an elutriation plant for the fine grinding of copper powder. To alleviate the condition, the escaped dust was conveyed to a canopy provided with side curtains of duck, sealed in a tank of water; more regular inspection of the bag filters was instituted, and provision was made for water spraying within the canopy. --- Fog formations in the vicinity of a liquid effluent treatment plant, where warm water containing traces of elemental phosphorus was neutralized, were caused by the presence of phosphorus pentoxide and steam. The amount of elemental phosphorus in the water could be reduced by filtration and chlorination. --- Improvements in the design of electrical precipitators resulted in a reduction of the quantity of "mud" requiring redistillation with accompanying fume hazard; in the electric furnaces, new tapping blocks were fitted at more frequent intervals; a venturi jet reduced the pressure at the furnace tops and of the escape of fumes from the openings. There were still technical difficulties to overcome. --- Smells from the production of a selective weed killer due to parachlorocresol could not be removed. --- The average escape from absorbers of HCl and acidity in exit gases (calculated in SO₃) met the requirements of the Act. --- Superphosphate processes revealed some inadequate scrubbing of waste gases and did not meet the Department's provisional standard of less than 0.1 grain total acidity (calculated in SO₃) in the escape. --- A single appreciable emission of nitrous fumes was due to bad cracking of the new stoneware towers as a result of overheating.

877

1952

COMPLETE COMBUSTION: A KEY TO SMOKE PREVENTION. Heating, Piping, and Air Conditioning, v. 24, Aug. 1952: 101. DLC (TH7201.H45, v. 24)

From one-half to three-fourths of the smoke produced in Chicago can be prevented by completely combusting the fuel which serves as the smoke source. In order to achieve maximum combustion efficiency, it is necessary to select the proper fuel and to supply the correct amount of air to the fire zone. Black smoke is an indication that at least 25% of the fuel money is being wasted.

878

1954

CONDENSATION IN DOMESTIC CHIMNEYS. Heating and Air Treatment Eng., v. 17, Apr. 1954: 101-103. DLC (TH7201.A4, v. 17)

The paper describes symptoms and causes of defects in new chimneys and gives details of construction to be adopted. Methods of dealing with existing defective chimneys are outlined. Considerations of design should include the following features: (1) use of linings resistant to attack of condensate from flue gases; (2) protection against the entry of excessive rain; (3) improvement of the thermal insulation, and (4) admission of extra air to flue gases.

879

1957

CONDENSATION NUCLEI OFFER TECHNOLOGY A NEW YARDSTICK. General Elec. Rev., v. 60, July 1957: 22-24. DLC

Particles of submicroscopic size are now being measured. One such group called condensation nuclei causes atmospheric moisture to condense forming water droplets which produce a variety of effects, e.g., fog. The size of the molecules upon which water condenses depends on the degree of relative humidity. For nuclei detection in the ratio of 1 to 100 trillion parts of air by weight, the air tested is brought to a condition of 100% relative humidity. It is expanded adiabatically, and the resulting decrease in temperature instantaneously elevates the relative humidity to more than 100%. The moisture condenses within a few msec and droplets around the submicroscopic nuclei can be counted. The size distribution, as well as the numbers of condensation nuclei, can be obtained. Added knowledge of condensation nuclei will result in better filters, and better smoke and fog detection devices.

880

1954

CONSOLIDATED CHEMICAL REDUCES POLLUTION AROUND HOUSTON. Chem. and Eng. News, v. 32, Oct. 18, 1954: 4168. DLC (TP1.C35, v. 32)

A converter unit recently completed cuts SO₂ emissions from Consolidated Chemicals sulfuric acid plants in Houston and Bayton, Texas, to one third of their former discharge. A new 300-ft steel stack disperses and dilutes exhaust gases. Construction of two sulfuric acid regeneration plants will recover the 130 tons of sulfur that now enter the atmosphere every day from other nearby industries. Wind direction and velocity are being recorded continuously, and a series of analyses to determine SO₂ content in the air are correlated to meteorological data. A chemical engineer investigates and checks each complaint. Research continues on feasibility of alkaline scrubbing to reduce SO₂ content in exhaust gases, and on treatment of exhaust gases by an ionization process. The greatest success of the company's program may come, however, from its public relation work.

881

1952

CONTAMINANTS IN THE AIR: WHAT THEY ARE. Indus. and Power, v. 62, Jan. 1952: 68-70, illus. DLC (TJ1.147, v. 62)

Pollutants, such as smoke, dust, fumes, vapors, and gases are defined, and physical properties as set forth by the American Standards Assoc., are outlined. Sources of air pollution are discussed, and the most common contaminants are listed and sizes given. A graphic presentation of Stokes' law illustrates the terminal velocity of airborne particles. Large particles settle out rapidly at the source.

882

- 1952
CONTROLLING SMOKE EMISSION WITH AUTOMATIC
COMBUSTION CONTROLS. *Indus. and Power*, v. 62,
Jan. 1952: 96, illus. DLC (TJ1.147, v. 62)

The automatic combustion control equipment installed in a St. Louis, Mo. power plant is described. In this installation, power units, operated by a master control, operate the forced draft inlet damper, forced draft fan turbine valve, stoker drive, and the boiler outlet damper. The controlled rate of stoker speed and air flow eliminate smoke emissions.

883

- Cooper, R. L. 1954
A STUDY IN ATMOSPHERIC POLLUTION. (Abstract).
Unio internationalis contra cancerum, acta (Brussels),
v. 10 (2), 1954: 102-103. DNLM

By techniques developed recently by the author, air samples in the area of Salford, a part of Manchester, England, were collected on filter paper and later examined for hydrocarbons by alumina chromatography and absorption spectrophotometry in a technique involving the principle of the liquid chromatogram. The presence of 3,4-benzopyrene was confirmed, and the following polynuclear hydrocarbons were identified: anthracene; pyrene; fluoranthene; perylene; 1,2-benzoperylene, anthanthrene, and 2 tentatively regarded as 4,9-dimethyl pyrene and 1,2-benzanthracene or one of the latter's alkyl derivatives. Earlier workers had found a seasonal variation of benzopyrene concentration in the air. These changes may have been accounted for by oxidation of benzopyrene by sunlight, or by variations in proportions of polluting agents. Preliminary studies would indicate that soot from diesel engine exhaust contains much more pyrene than benzopyrene, whereas soot from domestic chimneys and from smoke deposits contains about equal amounts. In considering the fate of these carcinogenic particles in the lungs, it may be that the carbon to which they are attached absorbs them so completely as to render them inactive. It is also possible that the powerful solvents such as a pyridine occurring in cigarette smoke dissolve them from the carbon. Some preliminary work has been done on analyzing quantitatively on a microgram scale the quinones and phenols derived from the hydrocarbons. Also in a sampling of nasal secretions collected over 7 days in London early in Jan. 1953, several hydrocarbons were identified. Much of the interfering material usually found in smoke samples was not present, possibly as the result of some interaction of the nasal fluids. The ratio of pyrene to benzopyrene was found to be about 6:1 indicating that much of the latter had undergone oxidation. Further, red and yellow substances similar in appearance to the quinones from benzopyrene, were found to be present.

884

- Cooper, W. C. 1956
EPIDEMIOLOGICAL STUDIES ON AIR POLLUTION. In
Univ. of Florida. Florida Engineering and Industrial

- Experiment Station, Gainesville. "Atmospheric
Pollution" ... Bulletin Series no. 83 ..., Sept. 1956.
p. 49-52. DLC-Sci

The whole question of the health effects of air pollution is an epidemiological problem of unprecedented complexity. Dramatic incidents in which unmistakable increases in local atmospheric contamination were associated with increases in illness and death are considered briefly. These include the Meuse Valley, Belgium (Dec. 1930), Donora, Pa. (Oct. 1948), and London (Dec. 1952) occurrences. Other epidemiological studies considered are those focussing on the Detroit-Windsor area (since 1949) and Los Angeles (Oct. 1954). It is pointed out that the "most troublesome problem to be considered in the public health aspects of air pollution is the possible effect of inhaling low concentrations, or recurrently high concentrations, of airborne contaminants over a period of yr.... What are some of the chronic or delayed effects which should be given first consideration in planning studies? First to come to mind are chronic diseases of the respiratory tract, such as bronchitis, emphysema, asthma, and chronic sinusitis.... Another major concern at present is the possible role which community air pollution may play in the causation of lung cancer.... The fact should also be mentioned that the epidemiologic[al] approach is applicable to studies of effects on animals and on plants...." It is concluded that "fundamental and lasting progress can come only from establishing facts by rigidly-controlled studies.... Control measures must be planned and carried out. They can be neither blanket measures which are hopelessly uneconomical, nor can they be so exquisitely pin-pointed to specific substances proved to be responsible for health damage as to be always behind the problem and public health demands for action."

885

- Corbett, P. F. 1953
THE SO₃ CONTENT OF THE COMBUSTION GASES
FROM AN OIL-FIRED WATER-TUBE BOILER. *Jour.*
Inst. Fuel, v. 26, Aug. 1953: 92-106, illus.
DLC (TP315.16, v. 26)

An investigation into the effect of fuel, load, and CO₂ on the SO₃ content of flue gases from an oil-fired boiler was planned, and the results analyzed statistically. Five oils, the sulfur contents of which ranged from 0.75 to 3.55%, were tested over a wide range of boiler operation conditions. The SO₃ produced under each set of conditions was measured, at various stages in the boiler, with both a dew-point meter and by chemical analysis. The statistical survey has indicated relationships between certain variables, but with other variables no relationship has been found on the basis of data available. In particular, it has not been possible to establish a direct relationship between the SO₃ and the total sulfur in the oil. The results show that with all the oils tested, from 1 to 3% of the SO₂ is oxidized to SO₃, giving rise to dewpoints of from 250° to 300° F. (Author's abstract)

886

Corey, R. C.,

1954

T. Ingram, and L. Greenburg.

BAD DESIGN CAUSES AIR POLLUTION: LACK OF BASIC DESIGN INFORMATION PREVENTS IMPROVEMENT OF COMBUSTION UNITS. Chem. and Eng. News, v. 32, Apr. 5, 1954: 1352.

DLC (TJ1.S6, v. 32)

At a symposium on air pollution, held at the Wagner College, New York, R. C. Corey stated that inclusion of such design features as tangential air jets would contribute to complete combustion of pollution-causing fuels. Complete combustion can be obtained in a single chamber; a secondary chamber is superfluous. T. Ingram said he has never seen an incinerator that did not create a hazard or nuisance at some time. L. Greenburg stated that his New York Air Pollution Control Department (APCD) concentrates its activities on fuel, design and construction, operation, and maintenance. Technical knowledge is lacking in design and functioning of incinerators, automobile engines, and other pollution sources. The research laboratory of the APCD is studying these facets of the problem. A promising solution to the diesel-fuel problem of pollution by aldehydes lies in the use of liquefied petroleum gas. All new combustion equipment installed in New York must be built in accordance with new specifications developed by the Department of Air Pollution Control, and are inspected after installation. Immediate improvement can be achieved by use of punitive powers given to the inspectors. (Quoted in part)

888

Creed, K. E., Jr.,

1953

R. B. Hill, and J. W. Breed.

EVALUATION OF OZONE PROTECTIVE AGENTS FOR ELASTOMERS; APPARATUS FOR THE EVALUATION UNDER DYNAMIC CONDITIONS. Analyt. Chem., v. 25, Feb. 1953: 241-244, illus.

DLC (TP1.I615, v. 25)

In order to evaluate various ozone protective agents for elastomers, a dynamic apparatus has been developed which provides an effective means for accelerated evaluation of the protective agents using a new mechanical arrangement for flexing the rubber, a new specimen shape, rigid control of the ozone concentration, and a new rating system. The apparatus consists of a series of rotating pulleys within a circular chamber. The test specimens -- circular molded belts -- are rotated around 2 pulleys which give them approximately 75 flexes/min with an elongation of 0 to 20%. The flexing provides a mobile surface, so that rigid waxy films cannot be formed, and the molded specimen eliminates the possibility of freak cracking and anomalies due to minute nicks or imperfections during dieing out. The large surface available for examination facilitates interpretation of results. Air at a rate of 1 cu m/hr passes through the chamber with a controlled ozone concentration of 25 ± 5 ppm (10^8) at 30°C. Uniformity is ensured by use of a fan in the chamber. The concentration of ozone is determined by the potassium iodide method. By a simplified rating system a nontechnical person can rate a large number of specimens rapidly and without elaborate equipment. (Authors' abstract, in part)

887

Cramer, H. E.,

1957

and F. A. Record.

FIELD STUDIES OF ATMOSPHERIC DIFFUSION AND THE STRUCTURE OF TURBULENCE. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 126-131.

DLC (RC963.A135, v. 18)

An analysis is presented of experimental data to determine the feasibility of establishing significant empirical relationships between diffusion and simple meteorological parameters. Under conditions of thermal instability, prediction of characteristic features of the time-mean plume (peak and integrated-crosswind concentration, plume width, etc.) over short travel distances appears to be a relatively simple matter. The reciprocal of the standard deviation of azimuth wind direction explains approximately 80% of the observed variation in these quantities over a travel distance of 200 m. Prediction of diffusion in conditions of thermal stability is more complicated. Estimates can be made by combining the reciprocal of the standard deviation of azimuth wind direction with either the stability ratio or the wind-profile parameter β . The experimental results indicate that simple power-law expressions with constant exponents do not adequately represent the changes in peak and integrated-cross-wind concentration.

889

Crider, W. L.,

1955

and L. H. Spinar.

AEROSOL PARTICLE SIZES FOR THREE SUSPENDING MEDIA AS RELATED TO RETENTION IN THE LUNGS. Army Chemical Corps, Fort Detrick, Md. Interim Report No. 112, October 1955. 14 p.

DLC-Sci

The problem of aerosol retention in the human lungs is considered, and the work done is correlated with that of other workers in this field. The report is concerned primarily with the effects of evaporation and growth of aerosol particles, on the assumption that the problem of determining the particle size for dissemination as an aerosol for maximum retention in the lung may be approached by determining the size to which the particles will evaporate when they are in equilibrium with the surrounding atmosphere. The equilibrium size will depend upon the composition of the aerosol solution, the original size of the particles disseminated, and the relative humidity of the atmosphere into which the aerosol is disseminated. The relative humidity of the atmosphere is directly proportional to the partial pressure of water vapor present in the air. When the concentration of solute in the particle has increased to the point where the vapor pressure of the particle is equal to the partial pressure of water vapor in the surrounding air, evaporation will cease and the particle will have attained its equilibrium size. Since the equilibrium particle size at various humidities is dependent

upon the vapor pressure of the particle, and since the composition of the aerosolent (i.e., the material to be aerosolized) has a definite effect upon the vapor pressure, the equilibrium particle size of an aerosol is dependent upon the composition of the aerosolent. The equilibrium particle size is inversely proportional to the concentration of the solute. The amount of solid in the particle at equilibrium is primarily determined by the initial particle size. Various effects on the evaporation and growth of aerosol particles have been studied for the three suspending media of gelatin-diluent, gelatin-disodium versenate, and CPH media. It is concluded from these studies that maximum retention in the human lung will occur if the aerosol produced from these media is in the range of 1 to 10 microns in diameter; an aerosol of 5 to 10 microns in diameter is very satisfactory for high retention. (Authors' summary, and text, in part)

890

- Crossley, H. E. 1952
A SPECIAL STUDY OF ASH AND CLINKER IN INDUSTRY. IV. EXTERNAL BOILER DEPOSITS. Jour. Inst. Fuel, v. 25, Sept. 1952: 221-225.
DLC (TP315.16, v. 25)

The grinding of coal to an average size of 70μ (1-120 μ) for use as pulverized fuel largely separates the coal from the associated minerals and even the minerals from each other into discrete particles. As the particles are burned in suspension in air and collisions are infrequent, the minerals are not again mixed and their residues appear separately in the fly ash. The shale particles which are ejected prematurely from the flame are white and rounded, those which continue in hot combustion chambers, are colourless solid spheres. The particles of iron minerals are converted to black rounded fly ash, consisting mainly of magnetite. The fly ash particles from mechanical stokers are larger (1-300 μ , or more) because the coal supplied to these stokers is usually not ground. Some are hollow due to the formation of sulphur trioxide from calcium sulfate (at temperatures above 2,200°F.) within the fused ashes. The fly ash from stoker firing is derived mainly from mixed minerals; only a few particles are pure shale or iron residues. It is probable that most of the fly ash comes from the unburned coal, i.e. from the front of the grate, and not, as is usually assumed, from the ashes at the back. Stoker-firing fly ash which passes straight through the system consists of sphere-shaped, colourless to brown and black particles, the coloration being due to various proportions of iron and shale. When the fly ash settles on a hot surface, these drab tones change to a range of bright colours, from yellow and pink to deep red. The magnetite spheres do not oxidize to ferric oxide by prolonged heating on boiler surfaces unless sulphur trioxide is present in the flue gases, in which case red ferric oxide results and SO₂.

891

- Crumley, P. H., 1957
and A. W. Fletcher.
THE EMISSION OF SULPHUR GASES FROM A DOMES-

TIC SOLID-FUEL APPLIANCE. Jour. Inst. Fuel, v. 30, Nov. 1957: 608-612. DLC (TP315.16, v. 30)

Determinations were made of the concentration of total sulfur compounds (determined as sulfur dioxide) in flue gas from a domestic openable stove during various stages of combustion of coal and coke. Concentrations of nitrogen dioxide were determined by drawing measured volumes of flue gas through a dilute solution of sodium hydroxide over half-hour periods. Analyses of flue gases were made at different times of the combustion process and results are given.

892

- Cummings, W. G., 1957
and M. W. Redfearn.
INSTRUMENTS FOR MEASURING SMALL QUANTITIES OF SULPHUR DIOXIDE IN THE ATMOSPHERE. Jour. Inst. Fuel, v. 30, Nov. 1957: 628-635, illus.; discussion, v. 31, Jan. 1958: 32-41 (passim).
DLC (TP315.16, v. 30)

An automatic recorder and a portable meter have been developed for measuring small quantities of sulfur dioxide in the air. The instruments are sensitive to 1 part of sulfur dioxide in 100 million parts of air over a range of 0.5 ppm. The recorder is designed for continuous operation on a fixed site; the portable meter is intended for rapid surveys in different areas. Their use in atmospheric pollution work permits a more realistic assessment of the amount of sulfur dioxide pollution than the lead peroxide candles and daily volumetric sulfur dioxide estimations. Minor improvements in the recorder are suggested; e.g., by preheating the incoming gas to approximately the temperature of the equipment, bubbles causing air locks in the capillary tubes could be eliminated.

893

- Curcio, J. A., 1953
L. F. Drummeter, C. C. Petty, H. S. Stewart, and C. P. Butler.
AN EXPERIMENTAL STUDY OF ATMOSPHERIC TRANSMISSION. --- Jour. Optica Soc. Amer., 43 (2): 97-102. 1953. DLC (QC350.O6, v. 43)

An experimental investigation was made to determine the general characteristics of the spectral transmission of the atmosphere in the vicinity of Washington, D. C., on the Chesapeake Bay, in the Gulf of Mexico, and in the Central Pacific. Transmission measurements were made at the wavelengths of approximately 15 of the Hg discharge lines in the interval 2500 Å to 6000 Å. Values of the spectral atmospheric attenuation coefficients (km⁻¹) have been computed. For all observations made, these values increase toward shorter wavelengths and this is most pronounced for wavelengths below 3200 Å, where true absorption, as well as scattering, contributes to the attenuation. (Authors' abstract)

894

- Curwen, M. P., 1954
E. L. Kennaway, and N. M. Kennaway.
CANCER OF THE LUNG AND LARYNX IN TOWN AND COUNTRY. *Unio internationalis contra cancerum, acta* (Brussels), v. 10 (2), 1954: 104-109, illus. DNLM

Statistical studies of the geographical distribution of mortality caused by cancer of the lung or of the larynx in England and Wales indicate that the mortality from cancer of the lungs has increased; that the mortality increases with the density of population; and that this increase cannot be based to any great extent on better diagnostic methods. Mortality from cancer of the larynx in men has also been shown to increase with density of population, while, though the sample is small, for the women the reverse is true. Within the last 10 yr the incidence of mortality from cancer of the lungs has more than doubled, while that for cancer of the larynx remains approximately the same.

895

- CUT SMOKE WHILE SAVING PRODUCT. Petroleum Processing, v. 9, Nov. 1954: 1731, illus.
DLC (TP690.A1P37, v. 9)

Standard Oil Co. of California is adopting a new vapor recovery system for truck-loading terminals which seals the point of contact between the loading hose and tank truck. The system includes an expandable plastic seal between the terminal loading downspout and the filling hatch on the truck, a vapor saturator, a gas holder, a 2-stage compressor, and an absorption column. A diagram is included.

896

- Daley, A. C. 1952
PUBLIC RELATIONS ASPECTS OF AIR POLLUTION CONTROL. *Air Repair*, v. 2, Aug. 1952: 28-31, illus.
DLC (TD883.A48, v. 2)

An extensive program of good public relations is required to make the public conscious of the menace of contaminated air and enlist public support for the Air Pollution Engineer program. This can be accomplished best through two channels: a sympathetic press and civic organizations. Particular attention should be given to women's organizations, such as the League of Women Voters which assisted the Air Pollution Division in Providence R. I. in signaling offenders by means of Ringelmann-type charts. On speaking engagements, an old-fashioned oil lamp and a bi-metallic thermometer, which showed a drop of temperature when the lamp was made to smoke, proved to be an effective educational device. Talks on health as related to air pollution were held by the Rhode Island Medical Society. When it was observed that over 50% of all recorded violations were caused by the hand-firing of bituminous coal, a limit of 20% on volatile matter for hand-fired bituminous coal was imposed. Nevertheless, the smoke nuisance continued, due to improper firing. Thanks to the strong backing of public opinion, a ruling was passed requiring

that hand-fired boilers be fired with either coke or anthracite. Experience in Providence has shown that a sound authoritative system of permits and fines is necessary.

897

- Dalla Valle, J. M. 1952
DRY DUST COLLECTORS FOR INDUSTRY. *Heating and Ventilating*, v. 49, June 1952: 104-110.
DLC (TH7201.H4, v. 49)

The theories, performance, and basic operating factors are given for inertial- and motor-powered dust separators applicable to industrial use. Inertial separators, in which the dust-laden air is confined along a slightly curved baffle, are of several designs. Particles having a greater inertia than air are projected into collection hoppers at points of curvature. Cyclone collectors are as high as 80% efficient for particles larger than 10 microns. The higher the dust concentration, in this instance, the higher the efficiency since the particles are forced to aggregate and behave as though they are large particles. The motor-powered separators function also as fans. The blades serve to direct the dust particles to a hopper. These dry collectors operate most satisfactorily when the dust load is high and the dust particles exceed 10 microns in size. Data are given for specifications of operation and design.

898

- Dalla Valle, J. M. 1953
HOW TO ESTIMATE DUST COLLECTOR COSTS. *Chem. Eng.*, v. 60, Nov. 1953: 177-183, illus.
DLC (TN1.M45, v. 60)

Cost factors of primary equipment for eliminating airborne solids, as well as estimations for such objectives as recovery of salvageable materials and collection of both harmful and objectionable pollutants are discussed. Data are presented covering bag-type, frame, reverse-jet, and unit filters, spray scrubbers, barrier-type wet scrubbers, louver cyclones, multi-cyclones, centrifugal impellers, electrostatic precipitators, and sonic collectors.

899

- Dalla Valle, J. M. 1956
METHODS OF CONTROL OF AIR POLLUTION. In *Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ... Sept. 1956. p. 27-32.*
DLC-Sci

The atmospheric pollution control methods discussed include: (1) dilution (use of chimneys); (2) arresters (inertial collectors, filters, precipitators, and other devices for collecting particulates); and (3) scrubbers, sorbers, catalytic agents, and means especially used for chemical mists and vapors. Efficiency of removal of specific pollutants, economic feasibility, and practi-

cality of each method is considered. Another method of control is suggested, that of substitution. "Substitution refers to (a) altering the process in such a way, using substitute agents, so that the production of atmospheric pollutants is either eliminated or reduced, or (b) development of a substitute and product by other means than [was] previously considered feasible or possible, so long as the end product involves the production of no air pollutants in its manufacture." It is pointed out that the term "efficiency" used in this discussion relates the weight of material captured to that in the incoming air of a collector. In the case of particulate matter, efficiency on a weight basis leaves considerable room for criticism. For this reason, other means must be used for gaging efficiency of particulate collectors, preferably on a size frequency. As a result, the following expression was developed:

$$\text{Efficiency} = 1 - \frac{N_0 D_0^3}{N_1 D_1^3} \times 100, \text{ where there are } N_1$$

particles/unit volume, having a mass mean median diameter D_1 , entering a collector, and there are N_0 particles/unit volume, having a mass mean median diameter leaving the collector. In an attempt to find new control procedures, the following methods, based on utilizing the properties of the pollutants present in the atmosphere, are being studied at Georgia Institute of Technology: (1) aggregation; (2) electrets (small electrostatic magnets blown into an aerosol cloud); (3) thermodeposition; (4) supercoolants; (5) catalysts, and (6) adsorption.

900

- Danis, A. L. 1956
SITE SELECTION AND METEOROLOGICAL CONTROL.
In Univ. of Florida. Florida Engineering and Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ... Sept. 1956. p. 33-38.
DLC-Sci

"A study of climatic data is a prerequisite to site selection, planning, and plant design for an industry having an airborne waste disposal problem." The steps in such a study are outlined. These include: (1) perusal of existing macro- and micro-meteorological records; (2) analysis of these data in an attempt to predict pollution concentration; (3) consideration of topography and its influence on local diffusion characteristics of the atmosphere; and (4) location of population relative to the proposed plant site. The meteorological aspects of the study are discussed. These include: (a) wind and temperature information; (b) periods of calm and light winds; (c) wind structure in the vertical; and (d) temperature gradient in the atmosphere. Of particular influence on the concentration or diffusion of air pollutants, is the latter (d). This is discussed in detail, and illustrations are presented for 7 different cases.

901

- Darley, E. F., 1956
J. T. Middleton, and J. B. Kendrick.
SULFUR DIOXIDE INJURY ON CITRUS. Calif. Agric., v. 10, Jan. 1956: 9, illus. DA

Foliage of sweet and sour orange plants was exposed to sulfur dioxide concentrations of 2.5 ppm and 6.5 ppm for periods of 2 to 6 hrs, at 72°F and 84% relative humidity. The sweet orange was more sensitive to sulfur dioxide than was sour orange. In addition to the defoliation occurring on the sweet orange, the extent of the bleaching symptom was about 2 times greater than on the sour variety. The extent of silvering on the lower leaf surface was greater on sour than on sweet oranges. The silvering effect appeared to be a less injurious manifestation of the effect of sulfur dioxide.

902

- Daugherty, R. L. 1957
INCINERATOR TESTING AND TEST RESULTS (A WRITTEN DISCUSSION). Jour. Air Pollut. Control. Assoc., v. 7, Aug. 1957: 118. DLC (TD883.A48, v. 7)

This is a discussion of F. R. Rehm's paper (cf. Air Pollution Bibliography, v. 2, Abstract no. 1306) in which Rehm states that the moisture content of feed material must be determined, and an analysis of incinerator refuse material is required to calculate a theoretical air requirement adjusted to the 50% excess air basis. Daugherty states that with fuels such as natural gas and coke the 12% carbon dioxide standard for dust loading is a very poor criterion. Orsat analysis is all that is required to calculate any excess air standard. A specific value of the percentage of excess air should be fixed which can apply to all fuels or combustibles. Examples are given.

903

- Davidson, W. F. 1953
DISCUSSION ON "THE REMOVAL OF OXIDES OF SULPHUR FROM FLUE GASES." Jour. Inst. Fuel, v. 26, Dec. 1953: 320. DLC (TP315.16, v. 26)

The paper by R. L. Rees (Jour. Inst. Fuel, v. 25, Mar. 1953: 350-357) is discussed in general. Specifically, the question of the marketability, and the effect on the established market of so much ammonium sulfate being produced if numerous power stations were to use the ammonia process in recovering sulfur from flue gases is propounded. In answer, Mr. Rees stated that he believed that in Great Britain, the value would result mainly in saving sulfuric acid and, therefore, sulfur thus, there would not necessarily be any increase in the production of ammonium sulfate nationally.

904

- Davies, C. N. 1952
DUST SAMPLING AND LUNG DISEASE. Brit. Jour.
Indus. Med., v. 9, Apr. 1952: 120-126, illus.
DLC (RC963. A23, v. 9)

Recent experimental findings from the literature on the retention of dust particles in the alveoli of human lungs are discussed with a view to defining an acceptance curve for air sampling apparatus. For particles of unit density, the maximum alveolar retention is between 50% and 60% of the dust inhaled and occurs between 1.5- and 2-microns in diameter; about 30% of the 5-micron particles are retained. Minimum alveolar retention occurs at 0.25 - 0.3-micron, smaller particles being more completely deposited. Alveolar retention from 0.3- to 2-microns in diameter depends on the ratio of tidal air to frequency of respiration, and does not change rapidly with rate of working. Upper lung retention varies with minute volume, however, and is therefore sensitive to muscular activity. It is concluded that selection of particles for sampling by an elutriator designed to accept 50% at 5-micron diameters (unit density) should give a good approach to an alveolar sample. Variation of the density or shape of the particles will affect alveolar retention, and elutriation in the same way since both depend on the sedimentation rate of the particles, so that a single selector will give a constant performance with all clouds. (Author's abstract, in part)

905

- Davies, C. N. 1952
SEPARATION OF AIRBORNE DUST AND PARTICLES.
PART I. Heating and Air Treatment Eng., v. 15,
Nov. 1952: 304-310. DLC (TH7201. A4, v. 15)

The article discusses the design and application of different kinds of separators. On the basis of calculations regarding impingement of particles on a cylindrical rod, a curve is presented showing the collection efficiency as a function of Reynolds Number and of the radius of the cylinder and flue particles. The performance of a scrubber is calculated, pointing out the influence of correct droplet size. A theory of cyclone separators is outlined, and a formula is developed for deriving the motion of a dust particle within the cylinder. The paper includes a discussion of the efficiency of air cleaners and fibrous filters.

906

- Davis, S. B., and G. Nagelschmidt. 1956
A REPORT ON THE ABSENCE OF PNEUMONOCO-
NOSIS AMONG WORKERS IN PURE LIMESTONE. Brit.
Jour. Indus. Med., v. 13, Jan. 1956: 6-8.
DLC (RC963. A23, v. 13)

Clinical and x-ray examinations were carried out on 14 men who had worked for periods varying from 12 to 35 yr in an environment polluted with limestone dust of a high purity of calcium carbonate, at various areas in

either the quarries or the grinding plants. These men had not been exposed to other dusts. No evidence of pneumoconiosis was found, although dust samplings of the areas showed many thousands of particles between 0.5 and 5 microns in size.

907

- Deasy, J. A., and D. Stahl. 1952
SURVEY OF PENNSYLVANIA LAWS PERTAINING TO
AIR POLLUTION. Air Repair, v. 2, Aug. 1952: 38-
43, illus. DLC (TD883. A48, v. 2)

A complete survey is presented discussing the laws of Pennsylvania which deal with the regulations on air pollution and the administrative agencies that enforce these laws. Three administrative agencies at the state level deal with air pollution: the Department of Labor and Industry, the Department of Mines, and the Department of Health. The legislation on air pollution apart from industrial air pollution, has been left to local authorities. Municipal air pollution regulations include smoke control, railroad laws, and a health, nuisance, and general welfare legislation, which prescribes the limits within which no obnoxious or offensive business shall be conducted. The Philadelphia ordinance deals generally with the air pollution problem, the Pittsburgh ordinance is directed primarily against smoke and the type of fuel which may be sold, but incidentally deals with other contaminants as well. A provision of law regulates municipal refuse disposal; an appropriation act has authorized \$15,000 for research and for investigation of burning gob piles, in order that they might be eliminated. A section of the Penal Code imposes criminal liability on any person who creates a public nuisance in polluting the air. Two bills were proposed (H.B. 66 and S.B. 743) to empower municipal regulation of air contaminants other than smoke and to create a State Smoke Control Commission and County Smoke Control officers who would be the enforcement officers for each county district.

908

- Decker, H. M., J. B. Harstad, and F. T. Lense. 1957
REMOVAL OF BACTERIA FROM AIR STREAMS BY
GLASS FIBER FILTERS. Jour. Air Pollut. Control
Assoc., v. 7, May 1957: 15-16.
DLC (TD883. A48, v. 7)

A description is presented of spun-glass pads, used as satisfactory air filters in situations which require bacterial-free air in inlet-outlet air distribution systems. The filter medium itself is as thin as coarse paper (10 mils), being comprised of glass fibers, 0.5 to 0.75 micron in diam, and capable of withstanding temperatures up to 1000°F. Prefilters are recommended to provide longer life for the spun-glass filters in cases where the dust content of the atmosphere is high.

- 909 Dennis, R., G. A. Johnson, M. W. First, and L. Silverman. **HOW DUST COLLECTORS PERFORM.** (Paper presented at a meeting of the American Industrial Hygiene Association, Atlantic City, April 24, 1951). Chem. Eng., v. 59, Feb. 1952: 196-198. DLC (TN1.M45, v. 59)

A field investigation of common types of commercial air cleaning equipment was undertaken by the Air Cleaning Laboratory of Harvard University for the purpose of expanding the knowledge of collector performance. The results of the field tests on filter-and inertial-type collectors are discussed in this report. An extensive tabulation of the data assembled from these tests on representative models of commonly used commercial dust collection equipment is given at the close of the paper. The information is assembled under the following three general headings: (1) Cyclones, Mechanical-Centrifugal, and Inertial Collectors; (2) Cloth-Screen and Tube Collectors Cleaned by Mechanical Shaking; and (3) Cloth-Bag Collectors Cleaned by Reverse Air Jet. Studies are now in progress on the performance of wet collectors and electrostatic precipitators.

- 910 Dept. of the Air Force (U.S.). **MEDICAL SERVICE: HEALTH HAZARDS IN AVIATION FUEL HANDLING.** Department of the Air Force, Washington, D. C. Air Force Pamphlet no. 160-162, Nov. 28, 1952, 8 p. DNLM

The potential hazards involved in handling aviation gasoline and jet-engine fuels are fire or explosion, acute intoxication or systematic poisoning, and acute or chronic dermatitis or skin burns. The operations in which such hazards are encountered are primarily fuel storage and tank cleaning, fuel servicing, and engine maintenance. The chief methods of detection, control, protection, and treatment of injuries caused by aviation fuels are outlined briefly.

- 911 **DESIGN OF COOLER CONDENSERS FOR VAPOR-GAS MIXTURES. PART I.** Chem. Eng., v. 60, Apr. 1953: 223-226. DLC (TN1.M45, v. 60)

Previous methods for the design of cooler condensers for vapor-gas mixtures had been limited to mixtures which remain saturated during condensation. The method described in this paper for calculating the required condenser surface area is suitable for handling mixtures of noncondensable gases and saturated or non-saturated vapors even in the case of superheating. Equations are given for calculating heat and mass transfer coefficients. An outline of equations for calculating variables of temperature and vapor pressure of the condensate is given.

- 912 **DESIGN OF COOLER CONDENSERS FOR VAPOR-GAS MIXTURES. PART II.** Chem. Eng., v. 60, May 1953: 238-240. DLC (TN1.M45, v. 60)

Part I of this article (cf., Air Pollution Bibliography, v. 2, Abstract no. 911) described a general method for the design of cooler condensers operating successfully regardless of whether or not the vapor-gas mixture remains saturated during condensation. Part II described the application of this method to a cooler condenser for the conversion of gases in an ammonia oxidation plant. The complete calculation of the condenser is outlined. By the calculation of the quantity of heat transferred in each step, the required heat transfer area can be derived by graphical integration.

- 913 **DETERMINING SMOKE DENSITY.** Indus. and Power, v. 62, Jan. 1952: 77, illus. DLC (TJ1.147, v. 62)

A brief review is presented of smoke-density measuring methods. External measurements can be made by four methods: (1) smoke charts, (2) instruments that employ smoked or screened glasses for matching the smoke density, (3) screens prepared by photographing parallel black lines on transparent celluloid or glass, and (4) photographing the smoke issuing from the top of a stack.

- 914 **DEWPOINTMETER.** Instrum. Rev., v. 4, May 1957: 348. DLC

"Developed from an original design of the British Coal Utilization Research Association, this instrument is especially valuable in installations where it is desired to measure acid density flue gases, e.g., in gas works, oil refineries, coal treatment plants, etc. It will give readings up to a maximum of 700° F." (Quoted in full)

- 915 Dickinson, J. E. **THE OPERATION AND USE OF THE TITRILLOG AND THE AUTOMETER.** Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 224-227, illus. DLC (TD883.A48, v. 6)

The 2 most commonly used automatic instruments for the measurement of sulfur dioxide are the Titrilog and the Autometer. Each of the instruments utilizes chemical absorption and oxidation; in the Titrilog the results are measured in terms of potentiometric titration with the titer generated electrolytically, while in the Autometer the concentration is measured as the change in conductivity of the absorbing solution instead of the quantity of a titer. For a permanent or semipermanent installation where sulfur dioxide measurement is the principal or only purpose, either instrument will be satisfactory. The Autometer, however, will probably

be simpler and less expensive to operate for this kind of sampling and will be subject to fewer interferences than the Titrilog, if properly installed and maintained. In situations which require determinations of other sulfur compounds, or where portability is an essential feature, the Titrilog should be selected.

- 916 Diggle, W. M., and J. C. Gage. 1955

THE TOXICITY OF OZONE IN THE PRESENCE OF OXIDES OF NITROGEN. *Brit. Jour. Indus. Med.*, v. 12, Jan. 1955: 60-64. DLC (RC963.A23, v. 12)

A concentration of ozone in the region of 10 to 12 ppm causes 50% mortality in mice exposed for a period of 4 hr. Repeated exposures at 2.5 ppm have no effect. Dilute mixtures of ozone and nitrogen dioxide in air react in part to give nitrogen pentoxide. The toxic effects of ozone and nitrogen pentoxide are qualitatively similar, though nitrogen pentoxide is about 3 times as active as ozone. The effects are additive, and the observed increase in the toxicity of ozone in the presence of oxides of nitrogen can be attributed to the nitrogen pentoxide present. The effect of these observations in the assessment of toxicity of industrial ozone concentrations is discussed. Tables are included.

917

- Dobrin, H. 1952
JAPANESE ARE SMOKE PREVENTION CONSCIOUS:
HIGH COST OF FUEL GIVEN AS PRINCIPAL REASON.
Air Repair, v. 2, Nov. 1952: 38-39, illus.
DLC (TD883.A48, v. 2)

The article describes general conditions of industry in Japan with reference to the smoke problem, as found by the author on a visit to that country. Japanese industrialists are buying a lot of American equipment and are very desirous to economize on fuel utilization, but have not developed sufficient versatility in the art of fuel combustion. Air pollution control action is urgently needed, especially in Kobe, which is called the "smoky city".

918

- Dodd, E. E. 1953
THE STATISTICS OF LIQUID SPRAY AND DUST
ELECTRIFICATION BY THE HOPPER AND LABY
METHOD. *Jour. Appl. Phys.*, v. 24, Jan. 1953: 73-
80. DLC (BF1.J55, v. 24)

The electric charges created upon individual microscopic particles of an aerosol during its generation have been determined by the Hopper and Laby oil drop method. In the spraying of nonconducting liquids, the charges produced upon droplets in the diameter range of 2-50 microns are found to follow a normal distribution with the average charge zero and the mean square charge proportional to droplet volume. This result favors the electrification mechanism of statisti-

cal fluctuation of electrolytic ion concentration among the droplets rather than the more prominent Lenard mechanism. The charge distribution among clean mercury droplets in the diameter range of 1-6 microns sprayed from a glass sprayer is asymmetric because of contact effects at the mercury-glass interface: the average droplet charge is positive, relatively large, and increases with droplet diameter. The dependence of dispersive dust charging upon particle surface roughness is illustrated by observations made with relatively smooth microscopic glass spheres and compared with data for rough crushed quartz particles. (Author's abstract)

919

- Donald, R. 1953
SUPERPHOSPHATE PLANT EFFLUENTS. *Chem. Age*, v. 69, Dec. 5, 1953: 1171-1172, 1176.
DLC (TP1.C33, v. 69)

In the manufacture of superphosphate, silicon tetrafluoride is the only gas which can create a health hazard. Requirements which control the emission of noxious or offensive gases into the atmosphere are listed. In the case of superphosphate gases, the acidity and not the fluorine concentration is measured. Removal of silicon tetrafluoride is based on the hydrolysis of this compound by water at low temperature. Requirements for gas purification from SiF_4 are: cooling and thorough wetting of the gases, slowing down by a delay period, and passage through a series of towers where the acid products of decomposition are absorbed. A description of this method is given including considerations for the most effective operation. Most acid constituents are removed by spray treatment and the organic odor by chlorination in the chimney. Efficiency of fluorine recovery is reported as 90%.

920

- Donoghue, J. K., and C. Mack. 1953
THE REDUCTION IN APPARENT PARTICLE CON-
CENTRATION WITH MULTIPLE STROKES OF THE
OWENS JET DUST COUNTER. *Brit. Jour. Appl. Phys.*, v. 4, Oct. 1953: 316-317.
DLC (QC1.I548, v. 4)

The custom of taking several strokes before counting the particles, when particle concentrations are low, has been assumed not to affect the efficiency of the Owens dust counter. In using the counter in this way, it was noted that the apparent concentration of dust particles decreased with the increase in the number of strokes of the counter. Some particles deposited in the latter part of a stroke when the air velocity is low may well be blown off by the high velocities in the early part of the succeeding stroke. A method is discussed for obtaining a correction curve which is easy to determine and appears to be sufficiently accurate for practical purposes.

921

- Drinker, P. 1954
AIR POLLUTION AND THE LONDON FOG OF DECEMBER 1952. Arch. Indus. Hyg. and Occupat. Med., v. 9, Mar. 1954: 247-248. DLC (RC963.A14, v. 9)

The number of deaths recorded during the 2-week period which covered the Dec. 1952 smog was 15% higher than for the corresponding period of the previous yr. It was established from this investigation and others that the concentrations of sulfur dioxide and smoke in the atmosphere tended to increase and decrease at the same times; it was also assumed that some of the other pollutants (e.g., carbon monoxide, carbon dioxide, and possibly sulfuric acid) did likewise. Sulfur trioxide and sulfuric acid mists occurred both as a result of direct emission or by the oxidation of sulfur dioxide, the latter condition being accelerated by the presence of moisture and catalytic substances under smog conditions. Estimates indicate that for each ton of coal burned, domestic fires produce 2 or 3 times as much smoke as industrial furnaces, and that they ordinarily cause about 40% of the smoke, with an increase to 60% in winter.

922

- Dubrow, B. 1953
CALIBRATION OF AIR PERMEABILITY PARTICLE SIZERS. Analyt. Chem., v. 25, Aug. 1953: 1242-1244, illus. DLC (TP1.I615, v. 25)

A method of calibrating the subsieve sizer, a commercially available air permeability apparatus for determining the average particle size of fine powders, consists of 2 experimental procedures employing fritted-glass diffusion tubes as standards. In one procedure, the airflow resistance offered by the glass diffusion tube is measured directly as a deflection of the manometer. The second procedure utilizes a wet-test meter to determine the air conductance through both the diffusion tube and the capillary flowmeters. With the aid of an equation, relating the variables associated with each of the 2 procedures, the manometric deflections of different subsieve sizers can be calibrated by independently measuring the resistance and conductance of the fritted-glass diffusion tube. The validity of the equation has been checked by comparing observed and calculated manometric deflections. Results are reported for glass diffusion tubes having porosities corresponding to nominal pore sizes from 0.9 to 60 microns. (Author's abstract)

923

- Dunicz, B. L., and T. Rosenqvist. 1952
DETERMINATION OF MICROGRAM QUANTITIES OF SULFIDE SULFUR. Analyt. Chem., v. 24, Feb. 1952: 404-406, illus. DLC (TP1.I615, v. 24)

A reliable method is needed for the determination of microgram quantities of hydrogen sulfide and sulfur in metal sulfides. A volumetric method based on the oxida-

tion of hydrogen sulfide into sulfate by means of alkali hypochlorite has been investigated. Systematic studies show that this reaction is influenced by the pH and the temperature of the hypochlorite solution. Quantitative oxidation of sulfide into sulfate occurs, at room temperature, in hypochlorite solutions of pH between 8 and 11, and between 14 and 15. In the intermediate pH range the oxidation is incomplete, and colloidal sulfur is formed. The lowest yield, at 0°C and pH 12, corresponds to about 50% oxidation to sulfate. As most favorable for analytical work, a hypochlorite solution of pH 14.4 is suggested. The method can be used for determining sulfur whenever it is present as hydrogen sulfide, or can be converted into it. (Authors' abstract)

924

- Dunn, H. L. 1955
LUNG CANCER IN THE TWENTIETH CENTURY. (Paper presented at the Nineteenth Annual Congress of the U.S. and Canadian Sections, International College of Surgeons, Chicago, Ill., Sept. 8, 1954). Jour. Internat. Coll. Surg., v. 23, 1955: 326-342. DNLM

Lung cancer incidence, as shown by studies of vital statistics, has increased in many parts of the world. The increase is much greater for men than for women; in man the increase varies considerably for different age groups. These differences cannot be explained substantially through improvement of cancer diagnostic facilities. Possible explanations of the increase, especially cigarette smoking, industrial carcinogens, and atmospheric pollution, are mentioned as being investigated in various countries.

925

- 1954
THE DURBAN CASE. Smokeless Air, v. 25, Autumn 1954: 25-26. DLC (TD884.S855, v. 25)

Recently the Durban City Council (Union of South Africa) requested that the Standard-Vacuum Refining Co. close its £6,000,000 oil refinery because it was a source of air pollution. Although an agreement has now been reached, the dispute served to indicate the difficulties which atmospheric pollution can cause when industrial development takes place in a residential area. The incident occurred last Jan., soon after the plant, situated on land purchased from the City Council and originally intended for residential development, was put into operation. Local residents complained of loss of sleep, nausea, and vomiting from the air pollution. As a result the managing director of the company promised that the fumes would be eliminated by use of additional control equipment. On April 14th, following further complaints, the City Council unanimously passed a resolution, calling on the refinery to close down completely and not to commence operation until it was guaranteed that there would be no further air pollution in the vicinity. The company was given 24 hr in which to comply. Within a week, an agreement was reached. A joint health office, open 24 hr a day, was set up in the city to investigate all complaints of pollution nuisance. In addition, a panel of independent ex-

perts was established to determine whether the plant is properly designed and operated.

926

1954
DUST COLLECTOR. Chem. Eng., v. 61, Sept. 1954: 272. DLC (TNI.M45, v. 61)

High efficiency is claimed for the reverse-air-jet dust collector described. Designed to handle extra-heavy dust loads, the collector consists of a large cylindrical perforated-metal cage enclosed within a cylindrical housing. Dust and dirt are filtered out of the air as it passes inward through the cylindrical filtration system. Collections pass to the receiver tube and drop into a hopper for removal. The filter medium is cleaned by a vertical blow tube that rotates continuously between the perforated metal cylinder and the filter medium.

927

1957
DUST COLLECTOR. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-5. DLC

Hagen Chemicals and Controls, Inc., Pittsburgh, Pa., [has developed] a new centrifugal-type dust collector, that [is claimed to have] the highest efficiency and lowest erosion rate of any mechanical dust collector on the market. The collector has had marked success in the elimination of fly ash from coal-fired steam boilers in steel mill power plants. Collection efficiencies have ranged as high as 97% in some installations. Hagen's new collector admits dust-laden gases into the inlet nozzles of the separating tubes, imparts a centrifugal motion to the gases, then changes the direction of flow. Entrapped dust particles are forced to the perimeter of the outside shell where they spill downward into the discharge hopper. The hot cleaned gases, meanwhile, recover from the induced centrifugal motion and resume their natural course upward through the inner annulus and out the clean gas chamber. (Quoted in full)

928

1957
DUST COLLECTOR. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-5. DLC

The Joy Manufacturing Co., Pittsburgh, Pa., has introduced a new, wet, inertial type dust collector, the microdyne, which is 1/10 to 1/20 the size of comparable equipment. The device has two essential parts: a mixer section and an eliminator section. The dust-laden air or gas enters the unit in the mixer section, where impingement takes place. The air and entrained, water-enveloped dust, pass through turning vanes as they enter the eliminator section. These vanes impart a helical motion which causes a centrifugal force, separating the entrained particles from the air. The dust-laden water is captured at the periphery of the eliminator section in blind louvers which are connected to a disposal sump. All water is recoverable and re-usable.

929

1957
DUST COLLECTOR, WET-TYPE. Indus. Wastes, v. 2, Sept.-Oct. 1957: D-5. DLC

A wet-type dust collector that operates on the filtration principle, designed by the National Dust Collector Corp., Chicago, Ill., is described. The dust is brought into contact with water under such conditions as to cause the dust to transfer to the liquid stream by impingement on filtering media made of glass or by entrapment within bubbles, water droplets, or mist. Requiring only 1/4 gal./min of make-up water for each 100 cu ft/min, the unit is self-cleaning, as a constant flow of water washes collected dust into a sludge tank equipped with a flight conveyor.

930

1954
DUST FILTER. Chem. Eng., v. 61, Sept. 1954: 272. DLC (TNI.M45, v. 61)

A system of removing fumes, dust, and smoke from air by a bed of moving granules is described. These units are recommended for controlling fumes and smoke in coke quenching, drying, and other operations where high temperature or corrosive conditions are present. The gases are passed through two or more cells containing moving granules. Solids in the gas strike the granules and adhere, so that exhaust gas is free of suspended matter. A washing circuit allows the granules to be used continuously. More than one size of granules can be used each to serve a specific purpose, e.g., moisture absorption, dust removal, etc.

931

1957
DUST MONITOR (ELECTROSTATIC). Instrum. Rev., v. 4, Feb. 1957: 79. DLC

"This apparatus provides a means of measuring the dust concentration of flue-gas and will be of particular interest to electricity-generating [power] stations. A fan draws a continuous sample of gas through the monitor, and then returns it to the duct. The first section of the monitor charges the dust particles in the space charge of a corona discharge, and they are collected in the second section under the influence of a dc field. The deposited charge flows to earth through a high resistance, and the voltage across this can be related to the charging voltage and the area of the dust particles. The weight of dust/unit volume of the gas can then be found since the sampling is measured, and the area of the dust/unit weight can be determined." (Quoted in full)

932

1952
DUST RECOVERY IS IMPORTANT AT NATIONAL CEMENT CO., RAGLAND, ALABAMA, PLANT. South. Power and Indus., v. 70, Feb. 1952: 72-73. DLC (TJ1.S8, v. 70)

The National Cement Co. plant at Ragland, Ala. employs a method of selective dust recovery to prevent economic losses. Material picked up by a vacuum cleaning system is conveyed to a primary separator, where approximately 80% of the dust is separated by centrifugal action and dropped into a hopper. The finest dust, which easily escapes into the air, is taken into a secondary separator, and is again subjected to centrifugal action before coming into contact with inverted filter bags, where the air is further cleaned. This clean air, finally, passes through the exhauster to be discharged to the atmosphere. The filter bags in the secondary separator can be readily cleaned by operating the outside lever of a bag shaker. The exhauster has no internal wearing parts the rotating element being supported by two externally mounted ball bearings. (Quoted in part)

933

DUST SAMPLER. Instrum. Rev., v. 3, Oct. 1956: 359, illus. 1956
DLC

"A dust sampler or long-running precipitator has recently been introduced. The instrument is placed in the return airway from a coal-face or other working place and collects a dust sample covering a whole working shift. For underground operation, the instrument is hung in position by a colliery official during the normal course of his duties. The instrument functions through dust-laden air being drawn by a small clock-work-driven breathing pump through the sampling head; 2 mm of air is inhaled in .5 min and exhaled in the following .5 min. The nonrespirable fraction of the dust is removed by passage of the airborne cloud through a horizontal elutriator. The remaining dust is collected on a horizontal microscope slide by a combination of gravity settlement and thermal precipitation." (Quoted in full)

934

Eiselen, E. W., and H. L. Clark. 1952
ODOR CONTROL IN LOS ANGELES COUNTY. Air
Repair, v. 1. Feb. 1952: 1-4. DLC (TD883.A46, v. 1)

Malodors caused by industries have been greatly reduced in the Los Angeles, Calif. area, and a number of industries have benefited from the results of alteration of their processes. Fish factories using methods of low-temperature dehydration in deriving fish meal from waste products have improved the nutritional value of their byproducts and have eliminated the noxious gas. Venturi-jet condensers and incinerators are now utilized to abate odors in rendering plants. In petroleum refineries, mercaptans are a great source of malodor. Methods of converting mercaptans to disulfides and sulfur dioxide, neither of which is particularly obnoxious, have eliminated much of this odor nuisance. Scrubbers are employed in most Los Angeles paint and varnish plants to reduce the emission of irritating substances such as acrolein, other aldehydes, and fatty acids. From an engineering standpoint, incineration of paint and varnish-cooker discharges is

the surest and most efficient method of reducing offensive odors.

935

Effenberger, E. 1955
[THE SIGNIFICANCE OF CONDENSATION NUCLEI IN HYGIENIC RESEARCH] Die Bedeutung der Kondensationskerne in der hygienischen Forschung. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). Geofisica pura e applicata (Milano), v. 31, May-Aug. 1955: 197-202. DGS

A thorough investigation of air pollution is possible only through the study of data concerning the most important gaseous and particulate atmospheric pollutants. In many cases, however, a rough assessment of pollution can be made by using simultaneous measurements of the nuclei and dust content of the air. Nuclei- and dust-content-count averages are given for various locations. It is pointed out that it will be possible for health authorities to verify the purity of air by means of simple measurement of nuclei and dust concentrations when uniform, portable instruments are designed.

936

Ehmert, A. 1952
[SIMULTANEOUS MEASUREMENTS OF THE OZONE CONTENT OF AIR NEAR THE EARTH AT SEVERAL STATIONS BY MEANS OF A SIMPLE ABSOLUTE METHOD] Gleichzeitige Messungen des Ozongehaltes bodennaher Luft an mehreren Stationen mit einem einfachen absoluten Verfahren. Jour. Atmospheric and Terrestrial Phys., v. 2 (3), 1952: 189-195, illus. DLC (QC801.J6, v. 2)

The local ozone concentration of the atmosphere has been measured over a period of time at several stations in Germany by means of a simple, chemical method, based on the oxidation of KI by O₃ in water and addition of Na₂S₂O₃. Measurement of the loss of Na₂S₂O₃ determines the amount of O₃ which has been absorbed. Typical examples are presented which clearly illustrate the destruction of ozone in the atmospheric ground layer and the dominating influence of the air exchange with higher levels.

937

Eisenbud, M. 1952
RETENTION, DISTRIBUTION, AND ELIMINATION OF INHALED PARTICULATES. Arch. Indus. Hyg. and Occupat. Med., v. 6, Sept. 1952: 214-225. DLC (RC963.A14, v. 6)

During nasal breathing, deposition within the alveoli of the lungs has been found experimentally to be maximum in the range of 1 to 3 microns. Larger particles were usually deposited in the upper respiratory passages. Deposition diminished with decreasing particle size down to 0.1 micron, below which it has been shown

that Brownian motion tended again to increase deposition. Particles in the size for maximum nasal retention comprised the largest portion, by weight, of the aerosols most commonly encountered. During mouth breathing, deposition within the alveoli was minimal for particles in the range of 0.5 micron and increased for both smaller and larger particles. (Author's abstract in part)

938

- ELECTRIC AIR FILTER.** Heating and Air Treating Eng., v. 15, July 1952: 204. DLC (TH7201.A4, v. 15)

The "Electromaze" is designed to remove airborne dust, dirt, pollen, and other particulate impurities of sizes down to 1/10 micron. Dirt particles in the air stream passing through the filter cells receive an electrostatic charge in the ionizing section and are then attracted to the oppositely parallel metal plates in the collector section. The collector plates, coated with a water-soluble oil adhesive, which retains the attracted particles, can be cleaned and dust deposits collected by periodic washings. A variety of sizes of the filter are available.

939

- ELECTRIC TRACTION AND SMOKE ABATEMENT.** Smokeless Air, v. 22, Spring 1952: 126-128. DLC (TD884.S855, v. 22)

It has been calculated that the busses in the central area of London, add 31,000 tons of soot per annum to an already heavily polluted atmosphere. It is suggested that elimination of this source of pollution can be brought about by the use of electric traction whenever possible, -- trams and trolley busses, battery-powered light delivery trucks, and electrified railways. Electrically powered vehicles possess the great advantage of rapid acceleration, rapid and safe braking, and almost silent operation. Although the top speed of an electric vehicle is said to be slow, (about 18-20 miles per hour), the speed of traffic in most urban areas is under 10 miles per hour so that high top speed is of no advantage. The electric equipment of such a vehicle needs very little maintenance; the batteries can be re-charged at night, when the cost of the current is less; and the coal used to generate electricity is of a low grade and unsuitable for other uses.

940

- [ELECTROLYTIC HYGROMETER].** Science, v. 125, Jan. 25, 1957: 167. DLC (Q1.S35, v. 125)

Announcement is made of a new electrolytic hygrometer, made by Beckman Instruments, Inc., which is capable of detecting water concentrations as low as 1 ppm in either gas or air streams. It can be operated for sampling either continuously or intermittently, and at temperatures up to 100°C.

941

- ELECTRONIC BARRIER AGAINST INVISIBLE DIRT.** Canad. Chem. Processing, v. 37, June 1, 1953: 50, 52, illus. DLC (TP1.C2, v. 37)

The problem of cleaning large volumes of air of dirt and dust particles of microscopic proportions has been met successfully at Ford's Oakville, Ontario, automobile plant by installing several electrostatic air cleaner units known as Precipitrons. In terms of the U. S. National Bureau of Standards "blackness test," this air-cleaning method provides 90% removal of particles down to 1/250,000 in.

942

- ELECTROSTATIC FILTRATION: DUST COMES OUT OF THE AIR.** Steel, v. 130, May 5, 1952: 105, illus. DLC (TS300.I745, v. 130)

Electrostatic filters are employed for removal of dust particles under 5 microns in size, while mechanical filters are effective for particles above 5 microns. In the electrostatic process, the fumes are passed through an ionizer, where the particles are charged positively. From there they are conveyed between negatively charged aluminum plates, to which they adhere. The plates are washed at regular intervals, sometimes by pushbutton operation. It is pointed out that the electrostatic method can in some cases remove up to 99% of the particles in exhaust fumes; most units, however, are rated about 90% effective by the Bureau of Standards.

943

- ELIMINATING SMOKE WHEN UNDERLOADING AND OVERLOADING BOILERS.** Indus. and Power, v. 62, Jan. 1952: 93, illus. DLC (TJ1.I47, v. 62)

The method of eliminating smoke during short periods of under- and overloading a stoker-fired boiler by means of an overjet is described. At a normal rating of 20,000 lb steam per hr, the unit operates satisfactorily, but at a low of 8000 lb and a high load of 30,000 lb of steam per hour, smoking was encountered until the supplementary overfire air system was installed. Sets of overfire jets located 15 in. above the grate eliminated the problem. Provisions are made blanking some of the nozzles, if necessary.

944

- Ellsworth, R. D., and R. B. Engdahl.** 1957
THE CONTROL OF EFFLUENTS FROM MUNICIPAL INCINERATORS. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 43-46, illus. DLC (TD883.A48, v. 7)

The ideal settling-chamber velocity of 4 ft/sec in the majority of simple inertia-type collectors of municipal incinerators will permit little settling of the particulate

matter. Methods of measuring dust emissions from incinerator flue gases are presented. Alternate methods of collecting flue gases are discussed, including wet scrubbers and electrical precipitators. Illustrations are included.

945

- 1958
ELUTION OF 3,4-BENZOPYRENE AND RELATED HYDROCARBONS FROM SOOTS BY PLASMA PROTEINS. Science, v. 127, Feb. 28, 1958: 474-475.
DLC (Q1.S351, v. 127)

The action of 3,4-benzpyrene in inducing skin cancers can be explained on the basis of the lipid-solvent action of sebaceous secretions in eluting the carcinogenic hydrocarbon from soot particles. The result of a study in vitro of soots of two representative sizes for quantitative hydrocarbon determinations is given. After exposure to plasma proteins, the 3,4-benzpyrene remaining on the small-particle soot (80 millimicron) decreased slowly. After three days of incubation, 60% of the benzpyrene remained; and after 8 days, the quantity of benzpyrene present dropped to 35%. The percentage recovery of polycyclic hydrocarbons from 500 millimicron soot particles and plasma after incubation of various durations is outlined in table form.

946

- England, G., 1957
C. J. Crawshaw, and H. J. Fortune.
A SURVEY OF DUST DEPOSITION IN THE NEIGHBORHOOD OF A POWER STATION. Jour. Inst. Fuel, v. 30, Sept. 1957: 511-519; discussion, v. 31, Jan. 1958: 32-41 (passim).
DLC (TP315.16, v. 30)

A report is presented of a survey carried out over the period from Dec. 1952 to Sept. 1954, to determine dust deposition in the neighborhood of a power station. Measurements were made with standard deposit gauges, and samples were taken to assess the emissions from the power station chimneys. The bulk of dust emitted from this power station (burning bituminous coal) was not found to fall within 2 1/4 mi. of the station. Dust measurements relatively close to the station were comparable with normal rates in a rural area. --- Theoretical formulas for the deposition of dust on the ground apply only when the emissions got away cleanly from the top of the chimney. The problem of accurate short-term measurements involves considerations of meteorological conditions and variables within the station (e.g., gas volume and temperature), especially when monthly deposition rates of dust are very low.

947

- Everts, C. M., Jr. 1956
EXPERIENCES IN DEVELOPING A STATE-WIDE AIR POLLUTION CONTROL PROGRAM. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar

on Air Pollution Problems... Sept. 20-21, 1955. p. 72-90. 1956.
DPH

Various aspects of the Air Pollution Control Program carried out by the state of Oregon are discussed under the following headings: (1) Factors Encouraging a State-Wide Control Program; (2) Provisions of the Oregon Air Pollution Control Act; (3) Initial Program; (4) Investigation of Complaints; (5) Complaints Where the Air Pollution Authority Recommendations Are Not Followed; (6) Municipal Actions to Establish Control; (7) Area Studies; and (8) Recommendations. The author states his belief that a three-year experience with a state-wide control plan in Oregon has shown that results can be produced by a cooperative approach and that air pollution can and will be reasonably controlled. The cost for the program over this period has been over two million dollars. A short discussion follows this paper.

948

- 1953
FACTORY STACKS: STUDIES OF ATMOSPHERIC POLLUTION. Chem. Age, v. 69, Aug. 1953: 228.
DLC (TP1.C33, v. 69)

Reference is made to O. G. Sutton's study of atmospheric pollution from factory stacks (Jour. Meteorol., v. 7, 1950: 307-312, and Quart. Jour. Royal Meteorol. Soc., v. 73, 1947: 426-436), as well as to C. H. Bosanquet and J. L. Pearson's (Trans. Faraday Soc., v. 32, 1936: 124), and W. F. Carey, Bosanquet, and E. M. Halton's papers (Proc. Inst. Mech. Eng., v. 162, 355, 1950). Theoretically, the smoke concentration at ground level is maximal at a distance from the foot of the stack roughly proportional to the stack height, then declines to zero. The maximum value at ground level is directly proportional to the rate of emission, and inversely proportional to the square of the height of the stack; which shows the advantage of high stacks in regard to air pollution. In addition, it is important for good diffusion that the temperature difference between the effluent and the outside air be as great as possible. The lower the stack, the more essential it is to conserve heat in the effluent; thus the omission of washing of gases in the stack, i.e., less cooling, will reduce pollution in the vicinity of the stack. In certain cases a stack heater should be installed. However, these calculations are valid only for level terrains. In hilly country, the problem must be studied by means of a wind tunnel scale model. This model may be used in two ways: (1) after the surface is sprayed with white paint containing lead acetate, and air containing a small amount of H₂S is discharged from the model stack, a rough estimate of the concentration is made from the density of the brown stain on the surface of the model; or (2) the behavior of the plume may be examined by atomizing paraffin in electrically heated jets.

949

- Faith, W. L., 1957
N. A. Renzetti, and L. H. Rogers.
AUTOMOBILE EXHAUST AND SMOG FORMATION. Air Pollution Foundation, Los Angeles, Calif.

Technical Report no. 21 (v. 2, no. 9), Oct. 1957.
103 p.

DLC-Sci

The relationship of automobile exhaust to smog has previously been established. Smog is primarily a reaction between organic matter and nitrogen oxides in the presence of sunlight. Data on photochemically produced smog reveal (1) a low concentration range of reactants, (2) disappearance of smog effects at night, (3) uniform geographic distribution over the affected areas, (4) more frequent occurrence of smog in West Coast cities than elsewhere, and (5) production of ozone by solar radiation in the wavelength region 3,000 - 4,000 Å. --- The design of internal-combustion engines is discussed, including the carburetor, combustion chamber, exhaust system, operating cycles, fuel consumption, and lubricating oil. The composition of auto exhaust gases depends on the air-fuel mixtures, which vary during the operating cycle. The exhaust flow rate depends on the operating cycle and cylinder displacement. --- An analysis of atmospheres affected by auto exhaust is presented, and the current status of the procedures for obtaining samples and subsequent analyses is reviewed. Control methods are discussed for the four general classes of compounds in automobile exhaust (smoke, carbon monoxide, hydrocarbons, and nitrogen oxides). Legal and enforcement problems involved in the air pollution abatement program are summarized.

950

Faith, W. L., and others. 1957
AUTOMOBILE EXHAUST AND SMOG FORMATION.
Jour. Air Pollut. Control Assoc., v. 7, May 1957:
9-12. DLC (TD883.A48, v. 7)

Hydrocarbons and oxides of nitrogen in concentrations similar to those found in the Los Angeles, Calif., atmosphere were subjected to the influence of sunlight in large glass greenhouses. Odor, eye irritation, and oxidant concentrations were developed which simulated the conditions of Los Angeles smog. Auto exhaust and evaporated hydrocarbons served as the source of hydrocarbons. Eye irritation and oxidant concentration both increased as the concentration of hydrocarbons discharged to the atmosphere increased. The auto exhaust hydrocarbons were more effective in producing oxidant than were the added hydrocarbons, 3-methylpentane and hexene-1. The effect of oxides of nitrogen concentration was more obscure. Charts are included.

951

Faith, W. L. 1957
NOTES ON SOLVING THE AUTO EXHAUST PROBLEM
IN SMOG FORMATION. Chem. Eng. Progr., v. 53,
Aug. 1957: 406. DLC (TP1.A6, v. 53)

Three approaches considered as solutions to the smog problem in the Los Angeles area are: (1) a fuel cutoff device on the carburetor, which would operate during deceleration; (2) a nitric oxide eliminator; and (3) an afterburner in the exhaust system to burn residual

organics catalytically or by direct flame. A table is given of the effects of engine operating conditions on composition of auto exhaust.

952

Faith, W. L. 1957
THE ROLE OF MOTOR VEHICLE EXHAUST IN SMOG
FORMATION. Jour. Air Pollut. Control Assoc., v.
7, Nov. 1957: 219-221. DLC (TD883.A48, v. 7)

Values for the various important parameters under the four common phases of automobile operation -- idle, acceleration, cruising, and deceleration -- are given in a table and discussed. Only the organic vapors and oxides of nitrogen emitted in automobile exhaust have been found in sufficient concentrations or are sufficiently widespread to cause eye irritation and to generate atmospheric oxidants that plague the Los Angeles area.

953

Faith, W. L., N. A. Renzetti, and L. H. Rogers. 1958
FOURTH TECHNICAL PROGRESS REPORT. Air Pol-
lution Foundation, San Marino, Calif. Technical Re-
port no. 22, Mar. 1958. 91 p., illus. DLC-Sci

Studies on the irradiation of automobile exhaust have shown that a ratio of hydrocarbon to nitrogen oxide concentrations from 2 to 10 produced eye irritation. Experiments revealed that irradiated exhaust produced with a premium blend of gasoline was more effective in producing eye irritation than that produced from a reformed gasoline under certain conditions. On the basis of examples of six fuels essentially the same ozone-forming ability and plant-damaging ability was demonstrated. Aerosol tests on automobile exhaust show the following relationships between aerosol and eye irritation: (1) removal of particles down to 0.2 microns reduces the eye irritation level; and (2) the photochemically produced particulates have a mass 6 to 10 times the original material and the particulate produced photochemically of carbon, hydrogen, and oxygen. --- Projects involving the photochemical reactions in urban air at low concentrations of reactants and the rate of reaction are discussed. There is evidence to the effect that the only three reactions of ozone fast enough to be significant in connection with smog formation are reactions of ozone with nitric oxide, nitrogen dioxide, and olefins. --- The paper includes a discussion on technical and economic aspects of auto-exhaust control methods.

954

Falk, H. L., and P. Kotin. 1957
THE CHEMICAL AND BIOLOGICAL CONSIDERATION
OF ATMOSPHERIC CARCINOGENIC AGENTS. Jour.
Air Pollut. Control Assoc., v. 7, May 1957: 12-14.
DLC (TD883.A48, v. 7)

Chemical carcinogens distributed throughout the atmosphere are considered. They fall into 2 groups: (1) polycyclic aromatic hydrocarbons which are exhaust products of internal combustion engines, both gasoline and diesel; and (2) oxidation products of aliphatic hydrocarbons which are derived from unburned gasoline, as well as from vehicular exhausts. This discussion of carcinogenesis includes a consideration of the chemical nature of the materials, the mechanism for their deposition on respiratory epithelium, an evaluation of their residence and stability in the respiratory tract, and the effect of these agents upon one another. It is concluded that air pollution is to be regarded as one of the causes etiologically associated with the increased mortality from lung cancer.

955

- Field, G. A. 1956
SCIENCE SOLVES AIR POLLUTION PROBLEM.
Paint Indus. Mag., v. 71, Oct. 1956: 88-93.
DLC (TP1.P17, v. 71)

In industrial kettle-cooking processes, e.g., paint and varnish manufacturing, fumes can be eliminated by catalytic combustion. By this means, the hydrocarbons and organic gases are converted by flameless combustion to carbon dioxide and water vapor. The system consists of hoods for the collection of fumes that are forced through collection ducts by exhaust fans; a preheat burner to heat the gases to oxidation temperature; temperature controls; a catalytic mat made of a platinum alloy bonded to nickel alloy ribbon; supports and housing consisting of a heat-resistant inner steel liner covered with insulation; and a double manifold which collects and discharges fumes. Temperature and ventilation are controlled to prevent back flashes, condensation, and corrosion of equipment. The catalyst does not combine chemically with the fumes, and thus should last indefinitely. This installation is not applicable for use with fumes that contain large amounts of cinders, inorganic solids, or vaporized metals that would harm the catalyst.

956

- Field, J. H., and others. 1957
COST ESTIMATES OF LIQUID-SCRUBBING PROCESSES FOR REMOVING OF SULFUR DIOXIDE FROM FLUE GASES. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 109-114. DLC (TD883.A48, v. 7)

Cost estimates are given for removing sulfur dioxide from flue gases by 3 liquid absorption processes involving: (1) a limestone slurry; (2) an ammonia liquor; and (3) a solution of sodium sulfite. A description of each process is given. Removal of the sulfur dioxide from a coalburning power plant of 120,000-kw capacity is used as a basis for the estimates. Charts and tables of costs are included for each of the 3 methods.

957

- FILTERS BY STATIC ELECTRICITY. Heating and Ventilating, v. 50, Jan. 1953: 122.
DLC (TH7201.H4, v. 50)

Announcement is made of a new washable plastic air filter. The unit, called Plotron, was developed by the Goodyear Tire and Rubber Co. The filtering agent in the unit has a life-long electrostatic charge and is capable of trapping and holding the finest pollen, soot, and dust particles.

958

- Fink, R. H. 1957
A MANAGEMENT APPROACH TO ODOR CONTROL.
Jour. Air Pollut. Control Assoc., v. 7, May 1957: 57-58. DLC (TD883.A48, v. 7)

The principles of odor abatement from the industrial management viewpoint are: (1) measuring odor sources by use of quantitative engineering techniques; (2) studying appropriate corrective actions; (3) establishing an aggressive control program with well defined responsibilities; and (4) following on a continuous basis a positive organization of an abatement program. Industry has found the method of odor unit determination as the most satisfactory tool for quantitative measurement.

959

- FIRST ANNUAL INVENTORY ISSUE. Chem. Eng., v. 61, Mid-Sept. 1954. 360 p. DLC (TN1.M45, v. 61)

A detailed index is presented of plants, facilities, processes, chemicals, materials, equipment, accessories, and technical literature advertised or covered editorially in Chemical Engineering during the publication year 1954. The index includes brief descriptions of processes involved and equipment specifications. Among the air pollution abatement equipment listed, filters, dust collectors, smoke detectors, etc. are included. Subsequent annual indexes will be supplementary.

960

- Fisher, A. F. 1957
DUSTFALL MEASUREMENTS. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 47-50, illus.
DLC (TD883.A48, v. 7)

A comparison is made of modifications of dust collecting basins. Values from identical gauges at one location may commonly have errors of 10 to 15%. The data presented for gauges of one type are within these limits of error. The equipment studied included the basins for collection used for tests in Toronto, Ont., Detroit, Mich., and Pittsburgh, Pa.

961

- Fisher, F. B., and J. S. Brown. 1952
**COLORIMETRIC DETERMINATION OF CYANIDE IN
 STACK GAS AND WASTE WATER.** *Analyt. Chem.*, v.
 24, Sept. 1952: 1440-1444, illus.
 DLC (TP1.1615, v. 24)

A method, which is based on the reduction of sodium picrate by cyanide to form a colored product, is presented for the quantitative determination of cyanogen and hydrogen cyanide in refinery stack gases and of those cyanides in refinery waste waters which are readily decomposed by strong acids. The determination is sensitive to 1 ppm and accurate to within 2%; the developed color is stable, and the determination is not affected by the other substances normally encountered in refinery wastes. Comprehensive discussion is presented of the variables affecting the picrate-cyanide reaction, such as reaction rate, reagent concentration, color stability, and interfering substances. The presence of sulfide or sulfur dioxide does not interfere with the determination. The procedure has been used for more than a yr for refinery control. (Authors' abstract, in part)

962

- Fisher, W. M. 1956
PUBLIC HEALTH ASPECTS OF AIR POLLUTION. In
 Public Health Service (U.S.). Robert A. Taft Sanitary
 Engineering Center, Cincinnati, Ohio. Proceedings of
 a Seminar on Air Pollution Problems ... Sept. 20-21,
 1955. p. 16-21. 1956. DPH

Health effects are discussed as analogous to epidemiological problems, acute episodes being considered as epidemics and constant low-level contaminations as endemic phenomena. The early health effects of air pollution are those which go along with minor or beginning air pollution, such as nuisance and odor, and are especially hard to evaluate. In considering laboratory findings on skin or lung cancer of laboratory animals, it must be borne in mind that these results may or may not be applicable to human findings. A question is raised whether there is immunization or a rapid development of tolerance in the case of eye irritation, especially lacrimation, which is known to appear early after exposure to air pollution and disappears within about a day. From studies of smog conditions in London, Donora, and the Meuse Valley, it was found that air pollution can contribute to disabling illnesses, especially in cardiac and respiratory diseases and in persons 45-55 years of age and older. As far as psychological effects of air pollution are concerned, the results of performance tests are presently under study. Inhalation studies have been carried out chiefly concerned with particles one micron or less in size, which are the most difficult to remove from the air and penetrate the lungs or spaces. The medical program is being carried out by a small full-time staff. Certain amounts of direct operating funds are to be used to support toxicological studies at the Occupational Health Field Headquarters and the development and maintenance of a relatively small basic staff in Washington, D. C., chiefly concerned with statistical studies

and epidemiological studies. There are available also the usual research grants of the National Institute of Health financed by transfer of air pollution funds. In addition, contractual research which is new in the Public Health Service for this program, can be used. --- In the discussion following this paper it was brought out that there appeared to be no evidence of a secondary effect on persons from eating food plants which had previously been subjected to air polluted by sulfur dioxide. A study is currently being carried out on the possible effect of air pollution by fluorides on cattle. An instance was mentioned in which the dental mottling among school children in two adjacent areas was considerably greater in the one area subjected to fluoride air pollution that could be accounted for by the intake of fluoride in the public water supply used in the area.

963

- Fitzgerald, J. J., and C. G. Detwiler. 1957
**OPTIMUM PARTICLE SIZE FOR PENETRATION
 THROUGH THE MILLIPORE FILTER.** *Arch. Indus.
 Health*, v. 15, Jan. 1957: 3-8, illus. DLC

The Millipore Filter is an excellent medium for particle-size-distribution and filter-efficiency studies because of: (1) the shallow surface collection of particulate material; (2) the ease of rendering the medium transparent with immersion oil for light-microscopic examination of the collected particulate material; and (3) the applicability of the silica replication technique for subsequent electron-microscopic size-count analyses. As with other filters of high efficiency, however, certain limitations must be recognized in order to use the material to best advantage. A point of maximum total penetration of particulate material through the filter with respect to particle size has been observed. Although this filter has frequently been considered exempt from the above phenomena, it appears to have some of the same characteristics as the conventional fibrous-type high-efficiency filter media. Whether the point of maximum penetration will significantly distort size counts and size-distribution studies depends on the relative fraction of the aerosol which falls with respect to size in the maximum total penetration size region. If a significant fraction of the aerosol falls within this size region, another filter medium should be substituted, or the face velocity adjusted, if possible, with the point of maximum total penetration in a different size region. (Authors' abstract)

964

- Flint, F. J. 1954
**COR PULMONALE: INCIDENCE AND ETIOLOGY IN
 AN INDUSTRIAL CITY.** *Lancet*, v. 267, July 10
 1954: 51-58, illus. DA

In a statistical study of all patients admitted to the City General Hospital, Sheffield, England, between Mar. 1952 - Mar. 1953, cor pulmonale was shown to be the commonest form of heart failure among the males. There were 64 cases of cor pulmonale among the 159

males, but only 12 cases among the 141 females. Of the 64 male patients with cor pulmonale, 42 had chronic bronchitis and 16 bronchiectasis, and most, if not all, had emphysema; none of the 12 females had uncomplicated bronchitis. The precipitating cause of heart failure in 74 of the 76 cases of cor pulmonale was an acute respiratory infection, usually acute bronchitis, most of the cases being admitted during the winter. A high percentage of the males were doing heavy manual work, 66% in the iron and steel industry of Sheffield, where they were exposed either to a high concentration of dust or to intense heat. At least 14 of the male patients were then engaged in outdoor occupations at various levels of manual work. All patients came from industrial areas in or near Sheffield where atmospheric pollution is high.

965

- 1952
FLUE DUST REMOVAL PLANTS: ECONOMY OF FUEL AND CLEANING. Chem. Age, v. 66, Jan. 19, 1952: 139. DLC (TP1.C33, v. 66)

A flue-dust removal plant, manufactured by Heat Economy, Ltd. of London, has been especially designed for dust removal from Lancashire boilers with steam working pressures from 80 to 200 lb/sq.in. Although the blower plant can be installed without the dust collector in small boiler houses, both blower and suction plants are recommended, the fly ash in both cases being removed without shutting down the boiler. All boiler flues are fitted with soot blowers operated intermittently once a day for a few minutes. The soot blowers which convey the flue dust to the front end of the bottom flue, are arranged in groups with each group having a steam supply. The suction plant consists of a cyclone separator for collecting the hot and very fine fly ash; vacuum is created by a single-stage steam-jet injector with condenser and water spray. A section nozzle is installed in each boiler and the fine dust is conveyed by tubing to the cyclone, from which it can be discharged directly into trucks for disposal.

966

- 1952
FLUE GAS SAMPLING. Heating and Air Treatment Eng., v. 15, Apr. 1952: 117. DLC (TH7201.A4, v. 15)

The underlying principle of the method of gas sampling described is that the gas samples are taken at the same rate of flow as that of the gas in the duct. The sample gas is washed, the dust is retained in the scrubber, and the clean gas drawn off through a flow meter to an exhaust. The filtering apparatus, which consists of a large washing funnel connected to 4 porous ceramic filters, recirculates the washing water, which is used more than once. All the measuring instruments, (flow meters, thermometers, and inclined and U gauges) are grouped together and form an integral part of the panel, which can be easily transported.

967

- 1953
FLY ASH COLLECTOR REGENERATES. Heating and Ventilating, v. 50, Apr. 1953: 135. DLC (TH7201.H4, v. 50)

The Breslove Separator Co. has announced the manufacture of a regenerative fly-ash collector. The unit is designed for installation in a steel stack. Gases pass into the first zone where they are accelerated resulting in the centrifugal whirling of the gas. This results in extraction of ash, cinder, and soot. The cleaned air is decelerated as it passes through the third zone thus recreating the original draft. No power, fan, or moving parts are used.

968

- Fochtman, E. G., and G. Langer. 1957
AUTOMOBILE PAINT DAMAGED BY AIRBORNE PARTICLES. Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 243-247, illus. DLC (TD883.A48, v. 6)

Paint on cars parked in a lot near a manufacturing concern was severely damaged by airborne material (small, brown particles). As a result, a study was conducted to determine the cause and source of this damage. The particles were found to be iron having a shape which could be reproduced by grinding a high-speed carbon drill with a medium coarse grinding wheel; on their combination with water, damage resulted. By multiple sampling, the source of the airborne particles was found to be 2 exhaust vents, one of which carried the exhaust from a ventilating system used to collect material from the grinding of steel springs. More efficient dust collectors were installed and the problem was solved.

969

- 1953
FOG FATALITIES. Jour. Amer. Med. Assoc., v. 151, Apr. 4, 1953: 1222. DLC (R15.A48, v. 151)

Fatalities during the London fog of Dec. 5-9, 1952, totaled 2489 for the week ending Dec. 13, 1952. During the week of the fog there were 10 times as many deaths due to bronchitis, 7 times as many due to influenza, nearly 5 times as many due to pneumonia, and 4 1/2 times as many due to pulmonary tuberculosis. In addition, there were nearly 3 times as many deaths resulting from disorders of the heart and circulatory system.

970

- Fonselius, S., F. Koroleff, and K. E. Wærne. 1956
CARBON DIOXIDE VARIATIONS IN THE ATMOSPHERE. Tellus (Stockholm), v. 8, May 1956: 176-183, illus. DLC (QC801.T4, v. 8)

The Scandinavian carbon dioxide sampling in 1955 is described. The mean results for the calendar year are

given. Earlier carbon dioxide measurements are discussed, and a figure showing most of these values is given. The theory of Callendar is discussed, and the Scandinavian values are compared with Callendar's. The seasonal variations at the Scandinavian stations are compared, and the results are considered. The possibility of drawing synoptic maps is discussed, and one example is shown. The desirability of systematic carbon dioxide measurements on a global scale is emphasized. (Authors' abstract)

971

- Fox, E. A., and V. E. Gex. 1957
PROCEDURE FOR MEASURING ODOR CONCENTRATION IN AIR AND GASES. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 60-62. DLC (TD883.A48, v. 7)

A method for determining the odor concentration in the atmosphere and in gases discharged from industrial operations by using a syringe is presented. The discussion includes the following items: (1) description of the apparatus, (2) operating procedure, (3) method of calculation, and (4) interferences. A sample of the atmosphere or gas whose odor is to be measured is diluted with odorfree air until a dilution is achieved in which the odor can barely be perceived.

972

- Francis, W. 1952
RECOVERY OF SULPHUR FROM FLUE GAS BY THE USE OF AMMONIA. (Letter to the editor). Jour. Inst. Fuel, v. 25, May 1952: 123-124.
DLC (TP315.I6, v. 25)

The author, inventor of a process in which flue gases are scrubbed with concentrated ammoniacal liquor (Brit. Pat. no. 545,767 (1942)), is contradicting certain points in S. P. Craxford, A. Poll and W. J. S. Walker's paper (cf. Air Pollut. Bibliogr. v. 1, no. 144). The author points out the priority of his findings and the precedence of the pilot plant he had installed at Fulham. The latter was of a much greater capacity than the new plant at Greenwich and could be controlled accurately by the pH of a test scrubbing solution. By using the improved type of plant and the cheapest available raw materials, the costs of flue-gas washing, and of recovery of by-products, are stated to be considerably less than half those mentioned in the paper by Craxford et al.

973

- Fraser, D. A. 1953
ABSOLUTE METHOD OF SAMPLING AND MEASUREMENT OF SOLID AIRBORNE PARTICLES: COMBINED USE OF THE MOLECULAR FILTER MEMBRANE AND ELECTRON MICROSCOPY. Arch. Indus. Hyg. and Occupat. Med., v. 8, Nov. 1953: 412-419, illus.
DLC (RC983.A14, v. 8)

A method is described and illustrated which uses a molecular filter membrane and an electron microscope. Visual measurement of the size distribution of the particles can be made by projection of the electron-microscope photograph on a screen. Results obtained by this method and by standard optical techniques have been evaluated critically. Further investigation is necessary in dealing with the problem of the effect of sampling methods on the state of aggregation of the particles.

974

- Fraser, D. A. 1957
FORWARD LIGHT-SCATTERING PHOTOMETER. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 139-144, illus.
DLC (RC983.A135, v. 18)

Equations for the distribution of the intensity of light scattered by spherical transparent particles show that any instrument based on this theory can be used to measure dust concentrations and will be extremely sensitive to changes in the size distribution of the dust. Monitoring of controlled dust concentrations of constant size distribution in an animal inhalation exposure chamber is an ideal situation in which to apply the instrument. --- A commercial forward light-scattering photometer is described. A calibration curve of the instrument readings against known transmissions of neutral density filters was used to produce a scale recording of the dust concentration directly in millions of particles per cu ft. Operation data for the instrument show the precision obtained and the advantages over the more common grab sampling techniques.

975

- FROM ASHES TO ASHES. Chem. and Eng. News, v. 34, Sept. 1956: 4438-4439.
DLC (TP1.C35, v. 34)

A unit for moistening ashes and other dry powders with water to minimize the dust problem during disposal is discussed. The unit is designed to be suspended from the base of a storage bin containing the ash. The mixer-unloader consists of an outer rotating drum tilted a bit from horizontal, a screw conveyor down the center of the drum, a rotary feeder, and a sprinkler system. As ash drops from the conveyor to the rotating drum, it is mixed with water which impinges on a splash plate near the higher end of the assembly. The wetted ash is then discharged into a waiting truck for disposal.

976

- FUEL, FOG, AND DEATH. Chem. Age, v. 68, March 14, 1953: 407-408.
DLC (TP1.C33, v. 68)

In view of the health danger involved in the concentration of air pollution, an aggressive national policy should be adopted. Smoke is emitted at the rate of one ton per year per 120 uncontrolled domestic chimneys. The public, which shows a preference for open fires,

is being insufficiently instructed concerning their economic wastefulness and their effect on air pollution. The true solution lies in pretreating domestic coal to remove its volatile ingredients and change it into a smokeless carbonaceous fuel.

977

- Fürth, R. 1955
ON THE THEORY OF DIFFUSION AND SEDIMENTATION OF CONDENSATION NUCLEI IN CYLINDRICAL CONTAINERS. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 80-89. DGS

The theory is given of a method for determining the diffusion coefficient, D , and the sedimentation velocity, V , of a suspension of uniform nuclei in a stationary gas contained in a cylindrical vessel with vertical axis and adsorbing walls. It is shown how D and V can be calculated from measurements of the total number, N , of particles in the container or the relative loss/unit time:

$$\Lambda = -\frac{1}{N} \cdot \frac{dN}{dt}$$

of this number for 2 different time intervals. From D and V , the size, density, and mass of the nuclei can be deduced. (Author's abstract)

978

- FUME SCRUBBER. *Indus. Wastes*, v. 2, Nov.-Dec. 1957: 13-A. DLC

The Schutte and Koerting Co., Cornwells Heights, Pa., has developed a fume-scrubbing unit for the elimination of obnoxious fumes or dusts at their source. The fumes to be scrubbed enter at a 14-in. suction intake induced by the drawing action of the water spray velocity. The diffusion of water and fumes takes place within the chamber, and the liquid passes on to a separator from which non-condensable, washed gases are vented to the atmosphere. Scrubbing water is recirculated to the unit.

979

- FUME WASHER. *Analyt. Chem.*, v. 25, July 1953: 30A, 32A. DLC (TP1.1615, v. 25)

"Announcement is made of the development by the United States Stoneware Co., of a compact, portable, yet high performance fume-washing tower for general laboratory and industrial use. The small-size yet high efficiency of the washer is made possible by the Intalox saddle tower packing which provides greater randomness of packing and, in a bed of given volume, exposes far more surface area to water and air than could otherwise be obtained. In operation, fume-laden air is drawn into the tower through the large air intake, and sucked up through the intermediate sections filled with

packing. Water, admitted at normal city line pressure, is sprayed over the packing by the spraytight distributor. As air rises in the tower, it is scrubbed thoroughly by the descending water which absorbs the fume content. Washed air, discharged from the top exhaust duct, is released into the room directly, or through suitably prepared duct work. Waste water leaves the tower through the drain." (Quoted in part)

980

- FUNDAMENTALS REQUIRED TO REDUCE SMOKE. *Indus. and Power*, v. 62, Jan. 1952: 89-90. 1952
DA (291.8 In2)

Five steps to follow in eliminating smoke are: (1) burning coal of correct size and classification, (2) automatic combustion control equipment, (3) proper supply of oxygen in a good pattern for the furnace, (4) smoke detection devices, and (5) synchroizing detection devices to obtain maximum efficiency from combustion controls. Recommended standard coal sizing specifications for spreader stokers, underfeed stokers, and chain or traveling grate stokers are analyzed.

981

- Gallaer, C. A. 1958
HOW TO COPE WITH FLY-ASH DISPOSAL. *Power*, v. 102, Jan. 1958: 90-91. DLC (TJ1.P7, v. 102)

Features of the fly-ash disposal system at the Long Island Lighting Company's 180-million-watt Barrett power station are discussed. First-stage cyclones and second-stage electrostatic precipitators handle 518,000 cu ft/min. of flue gas when the boiler operates at continuous capacity with high volatile bituminous coal. Dust collecting efficiency is over 95%. The entire system is automatic including discharging of dust hoppers.

982

- Gallily, I. 1957
ON THE FILTRATION OF AEROSOLS BY FILTER MODELS OF VARIOUS POROSITIES. *Jour. Colloid Sci.*, v. 12, Apr. 1957: 161-172. DLC (QD549.J67, v. 12)

In order to study the filtration of aerosols under defined conditions of flow and geometry of fibers, a new filter was built. This filter consists of an array of grids set perpendicularly within a metallic pipe. Each grid was composed of equally spaced similar metallic wires. To achieve parabolic, laminar flows, the Reynolds numbers were kept below the critical value of 2000, and the whole array was preceded by a "calming device." The filtration of homogeneous, electrically neutral aerosols of dioctyl phthalate by this filter has been studied at various velocities of flow, radii of particles, and interwire distances. It was found that the inertial mechanism of filtration was effective even at x values lower than the critical x 's given in the theories. When com-

paring the collection efficiencies of a wire in filters of varying inter-wire distances, a clear maximum could be discerned. It is believed that this unexpected phenomenon is caused by the nonadherence of some of the impacting particles to the wires - a possibility which has been taken into consideration only lately by Gillespie and Rideal. (Author's abstract)

983

GAS DETECTOR-ALARM. Instrum. Rev., v. 4, May 1957: 344. DLC

"This is a catalyst-activated toxic-combustible gas detector/alarm capable of detecting extremely small concentrations of gas in air. With a concentration of 0.6% coal gas in air, an alarm is given in approximately 30 sec, with a concentration of 0.1% carbon monoxide in air, an alarm is given in approximately 120 sec." (Quoted in full)

984

GAS-LIQUID CHROMATOGRAPHY APPARATUS. Instrum. Rev., v. 4, Feb. 1957: 93. DLC

"These components have been developed as separate items to enable users to make up apparatus to suit their own application. They comprise a katharometer, a thermostatically-controlled container, a control unit, and a dc amplifier. The katharometer is of copper with platinum filaments mounted in 2 tubes within the copper block. The control unit comprises 2 arms of a bridge with coarse- and fine-balancing adjustment. (The katharometer filaments from the other 2 arms). This unit also controls the current flow through the filaments. A revised version of the dc amplifier and microvoltmeter completes the range of the gas-liquid chromatography apparatus." (Quoted in full)

985

GASEOUS EFFLUENTS FROM GRANULATION PLANTS. Chem. Age, v. 79, Mar. 1, 1958: 397-398. DLC (TP1.C33, v. 79)

Venturi scrubbers are used to control effluents from fertilizer granulation plants in Scotland. Dusts, fumes, noxious gases, and liquid droplets can be eliminated by scrubbing, whereas other methods of treatment were not successful. The venturi scrubber installed at the Scottish Agricultural Industries Ayr factory has obtained efficiencies near 100% for all particles larger than 1 1/2 to 2 microns. Tests revealed that solid matter carried past previously installed dry cyclones varied in size from 3 to 20 microns. Limitations of other control methods in granulation processes are reviewed.

986

Gelman, C. 1957
ESTIMATION OF WATER SOLUBLE CHLORIDES, SULPHATES, AND NITRATES IN SUSPENDED ATMOSPHERIC DUSTS. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 216-219. DLC (TD683.A48, v. 7)

Suspended dusts are collected from air on a flat filter paper using a vacuum-cleaner-type air mover. Preliminary treatment of dust samples is given. An analytic method in which 50 ml of the water extract is treated with 30% hydrogen peroxide and titrated with mercuric nitrate is used for chloride determination. Water-soluble sulfates are determined using a modified turbidimetric procedure. Several methods of determining nitrates both by reducing them to nitrites and by inducing formation of nitrated derivatives in the presence of nitrates are outlined. Tables are included.

987

Gex, V. E., and J. P. Snyder. 1952
NEW DEVICE, WIDER CONCEPT HELPS TO MEASURE ODORS QUANTITATIVELY. Chem. Eng., v. 59, Dec. 1952: 200-201, 372, 374. DLC (TN1.M45, v. 59)

Many methods of odor measurement are now being studied, such as adsorption of materials followed by chemical analysis, infra-red adsorption, optical density, and refractive-index measurements. However, a threshold dilution method is preferable as it measures directly the sum total of all the chemical, physical, and physiological effects which add up to produce odor effects on human beings. A new testing device has been designed and built by the Proctor & Gamble Co. in 1949-1950, nicknamed the "Osmo." The function of the new device is to continuously mix fresh air with odorous air in adjustable and known ratios. The central unit of the Osmo is a cylinder with 528 equally-sized holes, surrounded by an outer cylinder enclosing the mixing chamber. A piston, which can be moved by an external crank, divides the inner cylinder into two sections varying the ratio of holes exposed to the odor source, which enters at one end of the cylinder and the fresh air source, which enters at the other end of the cylinder. Odorous and fresh air from the mixing chamber passes through the sampling fan to the nose of the operator. In operation, the piston is arranged so that the operator breathes fresh air only for a few moments, with the odorous air being mixed with the fresh air in slowly increased proportions. Although the reproducibility of the readings with this instrument from day to day varies somewhat with the operator and his physical condition, the measurements made within an hour or two are quite consistent.

988

Gibson, W. E. 1954
AUTOMATIC SAMPLING OF HYDROCARBONS. Oil and Gas Jour., v. 52, Feb. 1, 1954: 68-69. DLC (TN860.O4, v. 52)

An automatic sampling system for hydrocarbons is described which provides a sample frequency in direct proportion to the line flow. This has been accomplished through a time relay sequence using a mercury switch actuated by a small magnet attached to an integrating gear of the flow recorder. The system is fully automatic and leakproof. The design incorporates a pump, a floating piston, and double-ball check valves. The volume of the sample pump is set to give approximately 3,800 cc in 7 days. This system is adjustable for long or short sample increments. All drive equipment is fully explosion proof. A diagram is included.

provides a logical and sound foundation for developing federal activities in the field of air pollution. The provision for cooperative work with local, state, and federal organizations is both a principle and a necessity in view of the great complexity and scope of the problem in comparison with the resources available to cope with them. The Act provides for the conduct of research, investigations, training, demonstrations, and dissemination of information on air pollution. It also authorizes the use of contracts with, or grants to public and private research groups and institutions to carry out investigations and research.

989

- Gifford, F. 1957
RELATIVE ATMOSPHERIC DIFFUSION OF SMOKE
PUFFS. *Jour. Meteorol.*, v. 14, Oct. 1957: 410-414.
DLC (QC851.A283, v. 14)

The spreading of smoke puffs in the atmosphere should be governed by the laws of relative diffusion that have been advanced by Brier and by Batchelor, and not (contrary to what has been previously assumed) by Taylor's fixed-source diffusion law. The predicted mean-square puff spreading should proceed as time cubed, according to Batchelor's similarity theory of relative diffusion. Recent detailed smoke-puff measurements, reported by Frenkiel and Katz, and Kellogg, make it possible to test the similarity theory of relative diffusion. Examination of these data indicates the existence of a t^3 spreading regime. Values of the rate of eddy-energy dissipation are also inferred from the smoke-puff data. (Author's abstract)

991

- Gilcreas, F. W., 1956
and E. R. Hendrickson.
EQUIPMENT AND INSTRUMENTATION FOR AIR
SURVEYS. In *Univ. of Florida. Florida Engineering
and Industrial Experiment Station, Gainesville.*
"Atmospheric Pollution" ... Bulletin Series no. 83 ...
Sept. 1956. p. 21-26. DLC-Sci

The design and operation of various equipment used in automatic air sampling are described, and schematic diagrams are presented for 3 of the instruments. These include the Thomas Autometer (sulfur dioxide in air), the Titralog (sulfur dioxide in air), a noncommercial photometric sulfur dioxide recorder, a fluoride analyzer being developed by Stanford Research Institute, a Northwestern University photoelectronic particle analyzer (smoke, dust, mist). Other instruments are becoming available, e.g., 2 recently introduced instruments will analyze an air stream continuously for 1 or all of the following: nitrogen dioxide, nitric oxide, total oxidants, and sulfur dioxide. Since the effects of meteorological and climatological conditions on air pollution must also be considered, continuous measurement of temperature, humidity, wind velocity, rainfall, and sunlight is essential. The meteorological equipment used by the U. S. Weather Bureau is satisfactory for this purpose. It is concluded that the development of appropriate instruments for the sampling and analysis of the atmosphere is a basic necessity for solving the problems of air pollution.

990

- Gilbertson, W. E. 1956
WELCOMING ADDRESS: FEDERAL INTEREST IN AIR
POLLUTION. In *Public Health Service (U.S.). Robert
A. Taft Sanitary Engineering Center, Cincinnati, Ohio.*
Proceedings of a Seminar on Air Pollution Problems...
Sept. 20-21, 1955. p. 8-9. 1956. DPH

The growing interest on the part of Federal agencies in various aspects of the air pollution problem is said to have been activated in large measure by requests for consultation or technical services from state and local organizations. Air pollution legislation was enacted by the First Session of the 84th Congress as Public Law 159. The preamble to the Act is quoted as follows: "That in recognition of the dangers to the public health and welfare, injury to agricultural crops and livestock, damage to and deterioration of property, and hazards to air and ground transportation, from air pollution, it is hereby declared to be the policy of Congress to preserve and protect the primary responsibilities and rights of the states and local governments in controlling air pollution, to support and aid technical research, to devise and develop methods of abating such pollution, and to provide federal technical services and financial aid to state and local government air pollution control agencies and other public or private agencies and institutions in the formulation and execution of their air pollution abatement research programs." This declaration of policy

992

- Gillet, J. A. 1955
AN OUTBREAK OF LEAD POISONING IN THE CANK-
LOW DISTRICT OF ROTHERHAM. *Lancet*, v. 268,
May 28, 1955: 1118-1121. DLC (R31.L3, v. 268)

An outbreak of lead poisoning involving exposure of 293 adults (over 15 yr of age) and 232 children (15 yr of age and under) is discussed. It was found that car-battery casings were being used in the area as inexpensive fuel for domestic fires. Post-mortem findings following the death of 2 children showed that the liver contained 4 or 5 times as much lead as the lungs and less than the kidneys. This was stated to indicate that the poisoning was due to inhalation rather than to ingestion since a case of lead poisoning by mouth was quoted where the liver lead was 30 times the lung lead and more than that of the kidneys. Some question is raised concerning the

influence of the moderate and severely jaundiced conditions of the 2 children on these findings as a condition of jaundice would tend to interfere with absorption of lead taken by mouth. It is also pointed out that in the adult group only 1 case of lead absorption was detected; in the group of children, 55 cases were detected. Of these, 51 were in the group under 7 yr of age, thus increasing the likelihood of their having put dust-coated objects in their mouths.

993

- Gisclard, J. B., and others. 1953
A SIMPLE DEVICE FOR AIR ANALYSIS. Amer. Indus. Hyg. Assoc. Quart., v. 14, Mar. 1953: 23-25.
DLC (RD963.A135, v. 14)
An air-titration method is described in which the air to be tested is drawn through a selective absorbing solution containing very dilute standard indicator solution until a color change takes place. By noting the volume of gas required to effect a color change, a calculation can be made for the concentration of gas present. The apparatus consists of a 100-cc syringe, a T tube of any convenient size connected to the tip of the syringe by rubber tubing, and the wooden mounting. This device has been used successfully for testing industrial atmospheres for ammonia, sulfur dioxide, hydrogen sulfide, and hydrogen cyanide. The reagents and procedure necessary for testing the above atmospheres are presented. Equations are also given for determining the concentration of the gas being analyzed.

994

- GLASS BAG FILTER. Chem. Eng. Progress, v. 54, Jan. 1958: 90. 1958
DLC (TP1.A6, v. 54)
A glass bag filter for collecting hot, corrosive industrial dusts and fumes is described. The limitations of synthetic and natural fabrics used in the conventional filter bags have restricted their use to temperatures below 250°F. The unit described is capable of operation at temperatures to 600°F and of resisting deterioration by all substances except fluorine and hydrofluoric acid. The actual operation of the filter unit is the same as other conventional filter designs with efficiencies of near 100%.

995

- Glaser, R. A. B. 1956
SMOG DAMAGE TO FERNS IN THE LOS ANGELES AREA. Phytopathol., v. 46, Dec. 1956: 696-698, illus.
DLC (SB599.P935, v. 46)
A new symptom has been observed in ferns exposed to the polluted air of Los Angeles, Calif., following periods of high smog intensity. It is characterized by damage to the leaflets which results in a tan-spotting, followed by local or general dehydration of the affected areas, ending in necrosis of the entire leaf. Within 48 hr, part or all of the damaged frond may become dehy-

drated and brown. Stems, roots, and vascular elements of the leaf are uninjured. These symptoms are distinct from those previously observed in other plants. Illustrations of this effect are presented.

996

- GOB PILES. Air Repair, v. 1, Feb. 1952: 5-8. 1952
DLC (TD883.A48, v. 1)
Gob piles consist of refuse accumulated during coal-mining and coal-preparation operations. This résumé of the annual report of the Allegheny County Bureau of Smoke Control (Pa.) includes information on the location, composition, effects of location, incurred damages, reasons for combustion, and methods of controlling these piles of wastes. Major consideration is given to the control measures employed in situations where smoke and fumes from these gob piles have caused damage and expense.

997

- Good, C. H. 1955
THE FERRO-MANGANESE GAS-CLEANING INSTALLATION AT DUQUESNE WORKS. Air Repair, v. 4, Feb. 1955: 173-175, 183, illus. DLC (TD883.A48, v. 4)
Ferro-manganese blast furnace gas does not lend itself to the ordinary commercially available gas-cleaning methods. Problems arise because the dust contained in ferro-manganese gas is more correctly termed a fume since the extremely small particles are apparently formed by a process of vaporization and condensation; because such furnaces operate at much higher temperatures than basic blast furnaces; because the moisture content of the gas is high; and because, when wetted in the standard cleaning equipment, the gas fume forms a hard cement-like deposit. As a result, United States Steel Corp. has conducted extensive experimental work over the last 17 yr to develop a practical method of cleaning the ferro-manganese fumes. In the gas-cleaning installation discussed, the fume-laden gas enters the bottom of each of 5 conditioning towers which are supplied with banks of water sprays. These sprays are designed to cool the incoming gas from 700° to 350°F in such a manner that the fine mist will be completely evaporated into the gas without impingement of water on the side walls of the tower, and without water, as such, entering the effluent. The air then passes to the dry, plate-type, precipitators. The dust collected is discharged from the precipitator hopper by a dust plow, star valve, and a 12-in. ribbon conveyor, and after further processing and wetting is made into briquettes. Three men are needed to operate the above installation.

998

- Goodell, P. H. 1956
CATALYTIC COMBUSTION FOR INDUSTRIAL OVENS. Finish, v. 13, Apr. 1956: 25-29, illus.
DLC (TP812.A1F5, v. 13)

Catalytic combustion systems are now used on wire-enameling ovens, metal-lithographing ovens, foundry-core ovens, laminating ovens, and continuous-impregnation and painting ovens. Exhaust vapors from virtually all of the conventional varnish-, protective-, and decorative coating manufacturing processes are being oxidized by this method. Fumes entering the system are preheated to required catalytic ignition temperature by a preheat burner, and a flameless combustion takes place in the catalyst bed. By recycling a portion of the hot oxidized gases from the discharge side of the catalyst into the entering fume stream, a major portion, if not all of the heat for maintaining the catalytic ignition temperature is furnished. The entire system is mounted directly on the oven roof. Construction features, performance data, and safety factors of the system are discussed. Diagrams are also included.

999

- Gooderham, W. J. 1954
ACCURATE ANALYSIS OF WASTE GAS WITH A SOAP
FILM APPARATUS. *Chem. and Indus.*, no. 5, Jan.
30, 1954: 121-122. DLC (TP1.S6332, no. 5)

For use in the analysis of waste gas, an apparatus of similar accuracy to the Haldane gas analysis apparatus, has been developed which uses the soap film method. The apparatus incorporates the use of 4 soap film meters, each with a length of 35 in., with a bottom stem calibrated from 0 to 4% and a top stem calibrated from 80 to 105% in 0.1 divisions, where 100% is equivalent to 100 ml. There is also a small blower provided to deal with gases at or below atmospheric pressure. The U tubes contain various solid reagents, usually followed by soda lime, in testing of carbon dioxide, oxygen, or carbon monoxide. The apparatus was calibrated with oxygen-free nitrogen. In tests on known mixtures of carbon dioxide, oxygen, carbon monoxide, and nitrogen at initial rates of flow of 50 to 60 ml/minute, the results showed very little variation from the known percentages.

1000

- Goodman, N., 1953
R. E. Lane, and S. B. Rampling.
CHRONIC BRONCHITIS: AN INTRODUCTORY EXAMINATION OF EXISTING DATA. *Brit. Med. Jour.*, no. 4830, Aug. 1, 1953: 237-243, illus. DNLM

During 1950 a survey was made of the registered disabled persons in 4 areas of Great Britain, paying particular attention to the causes of disablement and their effect on employment. Since chronic respiratory diseases accounted for a large percentage of disablement, this led to a statistical study of death and sickness resulting from chronic respiratory diseases among the general population. There is ample evidence that deaths in smog disasters occur in older persons suffering from chronic respiratory and circulatory diseases. Exposure to continuous but much less severe atmospheric pollution, such as is experienced in many large towns, may contribute to the high death rate from chronic bronchitis of those who live in industrial towns;

no evidence is available, however, confirming this. Scandinavian countries, with a dry atmosphere having little pollution from smoke, record very few deaths from bronchitis. In a tabulation of the number of deaths from bronchitis in Great Britain by social classes, the "dusty" trades were high. Outdoor workers, i.e., gardeners, agricultural workers, railway porters, building laborers, were much less afflicted.

1001

- Goodwin, R. D. 1953
AUTOMATIC RECORDING OF CARBON DIOXIDE BY
CONDUCTOMETRY: METHOD FOR DETERMINATION
OF RATES OF COMBUSTION. *Analyt. Chem.*, v. 25,
Feb. 1953: 263-265, illus. DLC (TP1.1615, v. 25)

The method described for determining burning rates and total carbon content of carbonaceous materials is relatively economical of routine operating time. Carbon dioxide evolved in combustion experiments is continuously absorbed by a solution of barium hydroxide in a conductivity cell. The total amount of carbon dioxide evolved is measured conductometrically, and the conductivity is recorded continuously and automatically after suitable modification of the electrical signal. (Author's abstract)

1002

- Gordleyeff, V. A. 1956
SOME PROPERTIES OF UNIPOLARLY CHARGED
AEROSOLS: A REVIEW. *Arch. Indus. Health*, v. 14,
Nov. 1956: 471-481, illus. DLC (RC963.A14, v. 14)

The properties of electroaerosols and something of their application to biological, medical, and technical problems are discussed. The term "ions" or "air-borne ions" frequently used to indicate the carriers of atmospheric charges, is a misnomer since only in exceptional cases are atmospheric ions single-charged molecules of gas. In most cases, they are large molecular complexes, very small droplets, or tiny solid particles. The number of charges/particle is not limited to a few electrons; some atmospheric ions carry tens and hundreds of elementary charges. Even the smallest ions are larger than single molecules, and they are most probably charged molecular groups continuously associated with, and disassociating from, other molecules. The size of medium and large ions is that of condensation nuclei and of superfine aerosols. Microscopic and electronmicroscopic investigations of these ions reveal them as tiny droplets of moisture stabilized by the presence of minute amounts of impurities, like sulfuric acid, nitrogen oxides, and different halides, or tiny crystals of solid mineral matter. Naturally occurring atmospheric ions may owe their charges to many different factors, e.g., cosmic and solar radiation, presence of ionizing radioactive particles in updrafts from the earth's surface, frictional forces owing to the atmospheric turbulence, etc. Heavy ions prevail in atmosphere over large cities and other centers of industrial activity, and may be the direct products of combustion and similar processes on the earth's surface. The chemical character of the air-

borne particles has some influence upon the polarity of the carried charge. Since the potential of the earth's surface is a negative one, the positive ions in these layers are estimated to be 500-3000 ions/cc of air, depending on locality, on altitude, and often on season of yr and time of day. Atmospheric conditions have a strong influence upon ion concentration. Experimentally produced electroaerosols have been studied and some results have been applied to technical processes. Introduction of a unipolarly charged superfine aerosol into a dense but coarse water mist has supposedly caused optical disappearance of the fog and restored visibility in the humid atmosphere. Precipitation by electroaerosol of dusts which have acquired "natural" static charges may be expected, and, since such dusts are usually carrying charges of either sign, electromists of different polarities may be used alternately to assure a better precipitation.

1003

- Gordieyeff, V. A. 1957
STUDIES ON DISPERSION OF SOLIDS AS DUST AEROSOLS. Arch. Indus. Health, v. 15, June 1957: 510-515, illus.
DLC (RC963.A14, v. 15)

A compressed-gas pistol able to eject and disperse pellets of loose powder has been developed for testing purposes in determining the dispersion values for dry dusts. Performance data from experimental tests on the gas pistol and the powder charge are given. The gas pistol has been used successfully for evaluating acute inhalation toxicity of various substances dispersed as dry powders. Illustrations are included.

1004

- Gosline, C. A. 1952
DISPERSION FROM SHORT STACKS. Chem. Eng. Progr. v. 48, Apr. 1952: 165-172.
DLC (TP1.A6, v. 46)

The various factors of dispersion of effluents from a stack are discussed, including the theories of Bosanquet, Sutton, and Church. A field study was made of dispersion from an 80-ft stack. The data were analyzed to determine how the results of the tests compared with results predicted by the theoretical formulas, the range of concentration to be expected between averages and peaks, and the effects of wind speed, turbulence, and distance. It was concluded that by selecting the proper diffusion coefficients, either the Sutton or Bosanquet relations may be applied to the solution of problems involving design of stacks for waste disposal to the atmosphere. If the diffusion coefficients reported in the literature are used, the equation will predict average concentrations that agree within twofold of the actual. This can be improved by better selection of coefficients. In considering air-pollution problems, one must consider the time - average concentration at a point, the average maximum at a point, and the maximum at a point. These represent time intervals of 1/2 to 1 hr, or more; 1 to 5 minutes; and 1 to 10 sec., respectively. The character of the effluent and the type of problem anticipated will determine which of the time - average concentrations will be most important.

1005

- Gosline, C. A. 1952
PLANNING PREVENTS AIR POLLUTION. (Paper presented at a round-table session of the Manufacturing Chemists' Association Meeting in New York, Feb. 28, 1952). Modern Sanitation, v. 4, June 1952: 17-21, 73.
DLC (TD1.M8, v. 4)

The methods and sequential steps in a plan to avoid the creation of air pollution are described in detail. First step is the securing of management recognition which is the key to successful planning and ultimate solution for air pollution problems. At the research and pilot plant stage the necessary data are gathered to define most of the process conditions and waste characteristics. When alternate sites are to be considered, a visit to the sites must precede any estimation of the potential problems to be encountered. As soon as the site is decided on, on-the-site measurements should be made to define dispersion coefficients, to measure the persistence of stagnant-air conditions, and to survey the vegetation. Following this, a waste-disposal flow sheet should be developed and then applied to each process step, building, or piece of equipment as becomes necessary. Start-up assistance is to be given based on the prior determination of critical conditions and also to help adjust operation of the waste disposal equipment. And, finally, after operation starts a survey should be made to confirm the design calculations and provide a basis for further work, should it be indicated.

1006

- [Gosline, C. A.]
SIX-STEP PLAN FOR ABATING FOUL AIR. Chem. Eng., v. 59, May 1952: 352, 354, 356-358.
DLC (TN1.M45, v. 59)

In this review of a paper presented by C. A. Gosline at a recent Air Pollution Abatement Conference at New York, warning was given that since pollution is easier and cheaper to avoid than cure, all new processes and plants should be critically reviewed for waste disposal. The six steps established by the author for such a program are as follows: (1) collect all waste data early; (2) study conditions at plant site; (3) draw up a disposal flowsheet; (4) calculate capacities and sizes; (5) cut pollution during start-up; and (6) run a survey when operation begins. Considerable detail is given for each of these steps.

1007

- Gosline, C. A., 1956
L. L. Falk, and E. N. Helmers.
EVALUATION OF WEATHER EFFECTS. (In Air Pollution Handbook, New York, McGraw-Hill Book Co., Inc., 1956, Section 5, p. 5-1 to 5-68, illus.
DLC (TD883.M35)

Allowable stack emission rates, stack design, plant-site selection, and meteorological control are discussed in evaluating the effects of weather on air pollution. The section treats: (1) fundamentals of meteorology;

(2) atmospheric diffusion; (3) stack meteorology; (4) planning and interpreting air pollution surveys; (5) analysis and interpretation of data; (6) site selection and air pollution climatology; and (7) meteorological control. Tables and charts are included.

1006

[Graham, G. J.,
and others].

1957

REPORT ON GARBAGE COMPOSTING: ENGINEERING SOCIETY OF DETROIT IN COOPERATION WITH THE DEPT. OF PUBLIC WORKS AND THE WATER BOARD. Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 337-339. DLC (TD883.A48, v. 6)

In answer to a request from the Detroit (Mich.) Common Council for aid in obtaining information on converting garbage into fertilizer, the Engineering Society of Detroit appointed a Subcommittee on Garbage Composting to study the problem. A review of the literature was made, and information was obtained on 10 basic points including descriptions of processes and equipment, geographical location of unit, type of garbage processed, methods of collection, additives used, and cost of composting. After evaluation of the data, the Subcommittee recommended that composting, either for waste disposal or waste recovery, did not appear to be practical for Detroit. Among its conclusions, the Subcommittee found that the anaerobic process, while acceptable elsewhere, had failed primarily because of the odor nuisance, whereas the aerobic process was characterized by a minimum odor nuisance and rapid decomposition.

1009

Granville, R. A.

1957

THE CAPITAL COSTS OF SOME WASTE-GAS CLEANING PLANTS FOR USE IN IRON AND STEEL WORKS. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 125.

DLC (TD884.S855, v. 28)

The capital cost of some commercial cleaning plants capable of treating the waste gases from several processes operated in iron and steel works are presented in tabular and graphical form. The data were obtained by direct inquiry to plant manufacturers, and mostly relate to electroprecipitators. (Quoted in full)

1010

Gray, A. W.

1953

SOME LEGAL ASPECTS OF COALYARD OPERATION. Utilization, v. 7, Sept. 1953: 37-38.

DLC (TP315.U85, v. 7)

Details are given of several court actions involving coal-yards and their legal involvement as an air pollution nuisance. Cited as contributing factors in these actions were creation of noise, fumes, and odors, injury to

persons, damage to buildings and vegetation, and contamination of drinking water and food.

1011

Green, H. H.

1953

INDUSTRIAL FLUOROSIS. (Paper presented at a Regular Meeting of the Physical Methods Group, Society of Public Analysts and other Analytical Chemists, London, Dec. 3, 1952). [Abstract]. Analyt. Chem., v. 25, Mar. 1953: 531.

DLC (TP1.M615, v. 25)

The significance of emission of fluorine compounds into the atmosphere by industrial undertakings in relation to the health of man and animals, and in relation to damage to vegetation was discussed with particular reference to agricultural and social implications in relation to industrial interests. At least 28 industrial occupations of man have been associated with fluorine hazards, but many of these are within towns and do not concern livestock unless the factories are in the vicinity of farmland onto which particulate matter can be carried by wind and deposited on pastures. Of the large industries affecting local agriculture, those discussed included aluminum production, brickworks, enamel or color factories, the iron and steel industry, and collieries. Analytical techniques for fluorine in various materials were referred to, together with methods for assessing fluorine hazards and the need for further research into control measures.

1012

Greenburg, L.

1956

PROBLEMS IN OFFICIAL MUNICIPAL AIR POLLUTION CONTROL ENFORCEMENT. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 39-44. 1956.

DPH

The control officer in a municipal air pollution control program acts under legal authority which comes basically from two sources: a State or city enabling statute or law, and a set of rules or regulations which presumably have been drafted under that statute or law. The question of who is to have the rule-making power has usually been dictated by the legal document under which the program operates. In the County of Los Angeles this power is vested in the county board of supervisors, a group of men who have been elected to office and whose chief duties are very remote from the field of air pollution. Types of violation due to poor maintenance or poor operation of equipment can usually be remedied easily and quickly; but those violations which can only be remedied by new construction or reconstruction of equipment may take a long time to control and may bring up the question of who is, or should be, legally endowed to grant variations of the standards and the timetable. Whether or not to set any detailed specifications on equipment before it is installed, brings up many problems. The standards of emission set up by the legal agency often bring about serious problems in enforcement. Difficulties in the use of the Ringelmann

and similar charts, and the problem of the measurement of emission from motor vehicles on the streets and highways, are discussed. The enforcement authorities are in great need of correct and satisfactory values for permissible levels of discharge of pollutants since there are few satisfactory standards available to them now. In municipal regulations which make it a violation to exceed a certain Ringelmann number for a certain time period, the non-enforcement of the law may make the enforcement officer legally liable. Attention should be given to these legal aspects of municipal enforcement. The committee on administrative practice of the American Public Health Association, in 1920, formulated five major objectives for its functioning. These are cited as a guide to parallel objectives in the field of air pollution. The author urges the organization of a committee, under suitable technical sponsorship, to study the questions of State and municipal enforcement.

- 1013 Greenburg, L., and M. B. Jacobs. 1956
SULFUR DIOXIDE IN NEW YORK CITY ATMOSPHERE. *Indus. and Eng. Chem.*, v. 48, Sept. 1956 (Pt. 1): 1517-1521. DLC (TP1.N6, v. 48)

The results of a two-year air pollution study of sulfur dioxide concentrations in New York City are given. The highest concentrations of sulfur dioxide occur during temperature inversion periods. There is a seasonal variation in the concentration of sulfur dioxide in which the sulfur dioxide concentration is highest in the winter months of January and December and falls to a minimum in July and August (highest monthly maximum, 0.8 ppm, and lowest monthly maximum, 0.29 ppm). A daily variation was also observed. The concentration of sulfur dioxide falls off with increasing distance from the center of the city. Tables are included.

- 1014 Griebeling, R. T. 1952
CLEANING OUR AIR. (Address presented at the 46th Annual Meeting of the Smoke Abatement League of Hamilton County, Cincinnati, February 1951). *Smokeless Air*, v. 22, Summer 1952: 162-166. DLC (TD884.S855, v. 22)

The author, who came into the field of smoke prevention from advertising and public relations work, states the need for publicists, both professional and amateur, to keep the public informed about the various aspects of air pollution control. An educated and understanding public makes the work of air pollution abatement much easier and more fruitful. Since the members of the press are always interested in a cause, their invaluable aid is usually available. Some instances where air pollution control measures have not fared well, may have been the fault of the control officers or of the industrialists. The control officer may be too close to the details of his work or not have the ability to see its news value, or he may not enjoy the complete confidence of his own municipal administration for some reasons,

including political ones. The industrialist may take a negative view because of fear of poor reporting, distortion, or bad headlines. Some information is given on public relations in St. Louis, Pittsburgh, Cincinnati, and other cities. It is hoped that, as more attention is going to be focused on the need for air pollution control and for competent and capable men to enforce it, the salaries paid by many cities to their control officers can be raised to make this type of employment more attractive.

- 1015 Griswold, S. S. 1956
SMOG PROBLEM IN LOS ANGELES COUNTY. *Indus. Wastes*, v. 1, Sept.-Oct. 1956: 255-259, illus. DLC

An organization for smog prevention and control in Los Angeles County (Calif.) has been built up through the close cooperation of science, engineering, inspection, and enforcement skills and interests. A drastically expanded program of industrial plant inspection and law enforcement has been initiated using among other things 2-way radio communication and aerial observation and photography. Corrective measures are based as much as possible on research findings, and on existing, recognized, corrective recommendations. Research in the area has been undertaken with an understanding that smog is much more than a local problem; that effort should be made not to duplicate research going on in other areas; and that investigations should be pinpointed to specific sources and to developing answers to practical problems. There has been a tightening of existing laws, and a tailor-made control program has been established for each source of air contamination. Because of the prominence of hydrocarbons, or gasoline vapors, in contaminated atmospheres, the Air Pollution Control District of the county has staffed a complete automotive combustion laboratory to study this source of contamination.

- 1016 Griswold, S. S., L. A. Chambers, and H. L. Motley. 1957
REPORT OF A CASE OF EXPOSURE TO HIGH OZONE CONCENTRATIONS FOR TWO HOURS. *Arch. Indus. Health*, v. 15, Feb. 1957: 108-110. DLC (RC963.A14, v. 15)

The effects on human subjects of a two-hour exposure to ozone of 2 ppm concentration are discussed. During the observation period, air was drawn from the outside over a filtering system at a rate of one complete atmospheric turnover every 20 min., with ozone introduced continuously into the chamber. The ozone concentration was measured by a continuous oxidant recorder and by the rubber-cracking method. The chamber was shaded from direct sunlight; nevertheless the temperature rose to an average of 90°F, with a humidity of 80%. The following subjective symptoms were observed: throat and mouth dryness, lessening of mental ability to concentrate and absorb thought, sub-sternal chest pains of a constrictive character, and a continual sensation of odor. No eye irritations or

nausea were incurred. Spirogram recordings indicated a 13% reduction in total vital capacity after exposure to ozone, with a normal value resumed after 22 hr.

1017

- Gross, P. 1953
THE MECHANISM OF DUST CLEARANCE FROM THE LUNG: A THEORY. Amer. Jour. Clin. Pathol., v. 23, Feb. 1953: 116-120. DLC (RB1.A3, v. 23)

A theory is described which attributes to the alveolar macrophages, with the aid of the mucous coating, much of the activity of moving dust particles from the alveoli of the lungs into the bronchioles. In the bronchioles, the ciliated membrane act in further clearing foreign material from the lung passages.

1018

- Gross, P., and M. Westrick. 1954
PERMEABILITY OF LUNG PARENCHYMA TO PARTICULATE MATTER. Amer. Jour. Pathol., v. 30, Mar.-Apr. 1954: 195-213, illus. DLC (RB1.A4, v. 30)

Experimental observations indicate that most interstitial pneumoconiotic pigment deposits are probably extracellular agglomerations of particles. Assumptions that such pigments had been carried to this position by macrophages are conjectural and based on a premise which was found to be unacceptable on the basis of present findings. It was demonstrated that particulate matter per se may penetrate the respiratory membrane, and then migrate without the aid of phagocytic cells. Such penetration may be possible because of minute defects in the membrane, or because of the fluctuations of pressure during the respiratory cycle.

1019

- Grossman, P. R. 1957
DEVELOPMENTS IN SOLID FUEL BURNING EQUIPMENT IN AIR POLLUTION CONTROL. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 222-226, illus. DLC (TD883.A48, v. 7)

Efforts to reduce air pollution problems involved in solid fuel burning equipment have been directed toward burning the volatile portion of fuel without smoke and toward control of solid emissions and obnoxious components in flue gases. More complete combustion has been obtained by jet ignition stokers, circular pulverized coal burners, and cyclone furnaces. The cyclone furnace traps about 90% of solid flue gas pollutants in the form of a molten slag.

1020

- Gruber, C. W. 1952
DESIGN, INSTALLATION, APPLICATION OF FREE-BURNING EQUIPMENT FOR 25-500 HP RANGE TO PREVENT AIR POLLUTION. Air Repair, v. 2, Nov. 1952: 13-16. DLC (TD883.A48, v. 2)

When boiler plants in this smaller hp range are installed without the assistance of a design engineer, important details are often overlooked. Illustrating this, 4 cases are cited where adjustments were necessary after operation began. In areas where specifications for fuel-burning equipment do not receive prior approval by installation codes, such details as chimney size, loads, proper ventilation, and combustion in volume often go unchecked, resulting in inefficient plant operation. In Cincinnati, Ohio, in 1 yr, 48% of the observed smoke violations were caused by misapplied or improper equipment. Suggested checks are made to counteract the most common mistakes in fuel-burning installations, e.g., stoker design should be proved by test and required to meet the necessary performance standards; close liaison should be maintained between boiler and stoker manufacturers to insure proper equipment design. Charts are included to illustrate examples.

1021

- Gruber, C. W. 1952
FACTS ARE FIRST. Air Repair, v. 1, Feb. 1952: 13-16. DLC (TD883.A48, v. 1)

An effective program for industrial air pollution abatement has been initiated in Cincinnati, Ohio. The procedure used in the case of violators of the visible smoke phase of the city's clean air ordinance is outlined in steps, and illustrations of forms and codes involved are given. The city utilizes a complete district smoke record in its operations to record and evaluate the violations. A systematic inspection of new plant equipment, operating procedures, and general plant conditions is made regularly.

1022

- Gruber, C. W. 1952
SHOULD DUSTFALL METHODS BE STANDARDIZED? Air Repair, v. 1, May 1952: 28-29. DLC (TD883.A48, v. 1)

Variations exist in the methods of measuring dustfall, making studies in different localities incomparable. In an attempt to obtain a uniform system of measurement, the following should be standardized: type and size of containers; type and position of holders for containers; locations of collectors; type of collection (wet or dry); antifreeze used; algae inhibitor used; duration of exposure; method of analysis; method of calculating and reporting; and principles of selecting the sampling stations. It is pointed out that dustfall measures only the heavy settling solids. As a result, an air filter is needed to make complete quantitative studies of suspended solids, aerosols, and gaseous contaminants.

1023

- Gruber, C. W. 1953
NO SMOKING. Utilization, v. 7, Apr. 1953: 44, 46, 48.
DLC (TP315.U85, v. 7)

Several instances are cited of excessive smoke emission from boiler plants (within the range of 25 to 500-hp), indicating some of the problems involved in design, installation, and application of coal-burning equipment. Possible solutions of these problems are presented.

1024

- Gruber, C. W. 1956
TYPICAL AIR POLLUTION ORDINANCE PROVISIONS. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems ... Sept. 20-21, 1955. p. 45-50. 1956. DPH

In discussing typical ordinance provisions for air pollution, it is stated that up to the present, the authority for air pollution control is resting mainly with the municipalities, counties, or groups of counties. Interstate compacts, although they are being proposed, do not yet exist. Various phases of typical ordinance provisions are noted such as: Opening statement (enacting the ordinance), Definitions, Regulatory Board, Advisory Board, Appeal Board (or Hearing Board), Authority to Establish Rules and Regulations, Permit and Operating Certificates, Equipment Standards, Fuel Specifications, Reporting of Sales, Annual Inspections, Schedule of Fees, Standards of Emissions (including information on visible smoke, fly ash, other air pollution emissions, and exceptions to the above), Special Provisions, Enforcement, and Right of Entry into Premises. In summarizing the paper the author states that local ordinances should be drawn only after a study of the air pollution situation which prevails, and a determination of what is to be accomplished by such action. But it should be remembered that it takes a team of both ordinance and enforcement for adequate control.

1025

- Gruber, C. W., and G. A. Jutze. 1957
THE USE OF STICKY PAPER IN AN AIR POLLUTION MONITORING PROGRAM. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 115-117.
DLC (TD883.A48, v. 7)

The instrument described employs adhesive paper positioned vertically, with circular jars, 2.5 in. in diameter and 3.5 in. deep acting as supports. It is used to record particle fallout and to indicate the direction from which the particles originate. A set of standards for particle count estimation by visual reference has been devised for use with the test instrument. The visual comparator permits evaluation of the test "catch" according to a count number ranging from 1 to 9 which has been calibrated to a ψ (of collecting surface) value.

1026

- Grunder, L. J. 1953
HIGHWAY TRAFFIC CONTRIBUTES TO AIR POLLUTION. Air Repair, v. 2, Feb. 1953: 109-111.
DLC (TD883.A48, v. 2)

Driving conditions are of 4 types: idling, accelerating, cruising, and decelerating. Exhaust gases collected under these operating conditions show that gases which can be burned come out of the tail pipe only under decelerating conditions. The deceleration conditions cause too great a pressure on rarefied gas at the moment of ignition to initiate a conflagration although the fuel is present. This fuel mixture is forced out of the exhaust, and a recycling results in a partial oxidation of hydrocarbons. These hydrocarbons include the odoriferous aldehydes. The problem of diesel motors is also discussed. Diesels operating properly do not emit visible smoke or fumes; excess air burns the fuel completely. It is pointed out that mechanical condition is an important factor controlling the amount of air pollutants emitted by a motor. A chart is included illustrating the effect of different driving conditions on gasoline used/hr, units of hydrocarbons put into the atmosphere, and hydrogen concentration mg/liter. Mention is made that there are approximately 2 million motor vehicles in Los Angeles County, Calif.

1027

- Gurnham, C. F. 1957
WASTE SOLVENT INCINERATOR: SUCCESSFUL AT UPJOHN CO., KALAMAZOO, MICH. Indus. Wastes, v. 2, Mar.-Apr. 1957: 29-31, illus. DLC

The incinerator system described is used for disposal of large quantities of organic solvent wastes. Certain amounts of solid wastes are also burned in the system. No ash or residue results from the incineration of the waste solvents. The liquids are pumped from a 2500-gal receiving tank into an agitated 10,500-gal holding tank. The mixed solvent is then pumped to a 400-gal tank underground for cooling and settling, with the solid material being removed through a 2-in. sludge drawoff. The incinerator proper contains 3 burner units, all entering a large combustion chamber. Air is furnished by a blower and enters around the solvent nozzle at 5 in. water pressure. The flames are directed at a target wall, the hot gases sweep around a small hearth at one end of the combustion chamber, and are discharged to the flue. In addition, the plant employs biological treatment for aqueous wastes and deep-well disposal of wastes not amenable to ordinary treatment.

1028

- Haagen-Smit, A. J., and M. M. Fox. 1956
OZONE FORMATION IN PHOTOCHEMICAL OXIDATION OF ORGANIC SUBSTANCES. Indus. and Eng. Chem., v. 48, Sept. 1956: 1484-1487. DLC (TP1.T6, v. 48)

Laboratory studies on the formation of ozone are discussed. Hydrocarbons and their oxidation products were irradiated in the presence of nitrogen dioxide, and

- the ozone concentration, measured by two methods, was determined after exposure for different lengths of time. Concentrations can be determined by rubber cracking and by measuring the difference in vapor pressures of ozone and nitrogen dioxide. At a concentration of 3 ppm and varying concentrations of nitrogen, and of the hydrocarbons, (n-butane, n-pentane, n-hexane, n-heptane, n-octane, n-nonane, 1-n-hexane, di-isobutylene, and 3-methylheptane) curves of ozone formation were obtained. Optimum ozone formation was found to be in the region from 1 to 3 ppm nitrogen dioxide. Ozone formation during photochemical oxidation results in the hydrocarbon oxidation products (acids, aldehydes, ketones, and alcohols). Oxidation rates of 3-methylheptane and 2-butene obtained by experimental reactions with varying concentrations of nitrogen dioxide are given.
- 1029
Haas, A. R. C., 1955
and J. N. Brusca.
FLUORINE TOXICITY IN CITRUS. Calif. Agric., v. 9, Mar. 1955: 15-16, illus. DA
- Orange and lemon seedlings in silica sand cultures supplied with a nutrient solution, containing 400 ppm of sodium or potassium fluoride, showed loss of chlorophyll near the leaf tips, and new-leaf formation of reduced size. Results of the tests are demonstrated in illustrations.
- 1030
Hall, S. R. 1952
EVALUATION OF PARTICULATE CONCENTRATIONS WITH COLLECTING APPARATUS. EXAMINATION OF AIR POLLUTION LEVELS IN LOS ANGELES COUNTY. Analyt. Chem., v. 24, June 1952: 996-1000, illus. DLC (TP1.1615, v. 24)
- Measurements based on a reproducible procedure offer a logical and acceptable means for evaluating pollution levels. Particulates are collected on flat filter disks and measured by means of a Beckman spectrophotometer. Limitations and advantages of a proposed scale of values for particulate levels are discussed. Procedures for calibrating the scale of particulates in terms of carbon or other materials are given. An automatic collecting apparatus is described briefly. For research studies, a curve of particulate level variation is extremely useful in analyzing other related data. Air pollution control officials can use the procedures for obtaining accurate comparable data to evaluate the effectiveness of control measures. Particulate levels and their variations with time are obtained with a minimum of labor. Personnel may be more effectively used, as data may be collected continuously and stored. (Author's abstract in part)
- 1031
Halliday, E. C., 1957
and E. Kemeny.
ATMOSPHERIC POLLUTION IN A SOUTH AFRICAN CITY. APCA News, v. 5, Sept. 1957: 3-5. DLC
- Results of a two-year air pollution study in Pretoria, South Africa, are discussed. Changes in ventilation in the air above the city with change of season, are not as marked as might be expected. The change in smokiness, of approximately 70%, which occurs from summer to winter can be attributed almost entirely to increased use of coal during winter. A comparison is made of air pollution in Chattanooga, Tenn. and in Pretoria. A table is included which contains the results in consolidated form of deposits, smoke concentrations, sulphur dioxide content, etc., for the two-year period.
- 1032
Hamilton, R. J., 1956
and B. A. Phelps.
THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING. Brit. Jour. Appl. Phys., v. 7, May 1956: 186-188, illus. DLC (QC1.1548, v. 7)
Also published in Battelle Tech. Rev., v. 5, Aug. 1956: 515a. DLC (Z7403.B35, v. 5)
- The technique of shadowing by metal evaporation in a vacuum was adapted to the production of plane negative images of dust deposits on microscope slides to natural size of vacuum evaporation of metal at right angles to the slide, and subsequent removal of the dust. Many of the optical problems arising from the association of automatic counting techniques with high power light microscopy, i.e., depth of focus and variable contrast between particles and background, and between different parts of single particles, are avoided by substituting the shadow for the original specimen. (Authors' abstract in part)
- 1033
Hammond, J. W., 1953
and R. J. Davis.
HEALTH AND VENTILATION IN AN AIR CONDITIONED SHOP. Heating and Ventilating, v. 50, Jan. 1953: 93-95. DLC (TH7201.H4, v. 50)
- The manner in which specific problems in air pollution were handled at the mechanical shop of the Humble Oil and Refining Co. is discussed. The meter shop became contaminated during the summer months when smog emitted by the welding units accumulated. Analyses of air samples were made, the air being collected with a MSA electrostatic air sampler. The fume concentration ranged from 6-47 mg/cu m. Analyses of the air samples yielded results similar to those obtained from analyses on settled samples. Eye and throat irritations were attributed to the build-up of ozone and nitrates as well as to molybdenum fumes. Corrective measures included improved exhaust units near the

welding bays and the replacement of a charcoal furnace with an electric one. The furnace is used to preheat bronze parts prior to bronzing.

1034

Harp, J. L., 1955
and J. M. Pilcher.

A CASCADE IMPACTOR FOR DETERMINING THE DROP-SIZE DISTRIBUTION OF FUEL MISTS. Battelle Memorial Inst., Columbus, Ohio. Issued by Aeronautical Research Lab. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 55-428, 1955. 28 p. (Contract AF 33(038)-12656, Task 70334; Project 3012).

DLC-Csl

This report covers the development of an instrument for use in determining the drop-size distribution of finely divided fuel sprays. With the Battelle No. 7 cascade impactor, sprays can be classified into seven fractions having known size limits. The cutoff size, which is the size of droplet of which 50 per cent impact and 50 per cent pass on the succeeding stage, between the first and second fractions is 44 microns. The cutoff size of each succeeding fraction decreases by a factor of 2 and is 1.4 microns for the last impaction stage. A quantitative determination of the amount in each size fraction yields the distribution of the spray sampled. The maximum cutoff size that may be achieved for the first stage, without encountering appreciable wall loss, was extended from approximately 20 microns to 44 microns. This increase in upper drop size was made possible by the development of a method of introducing boundary air through porous jets to minimize the loss of droplets. The maximum size of droplet that may now be classified satisfactorily has thereby been extended to approximately 80 microns. Procedures are given for calibrating the cascade impactor which is capable of rapid, accurate, and reproducible results provided drop size does not exceed about 80 microns. The procedure for designing the Battelle No. 7 cascade impactor is outlined with particular emphasis on the problem of minimizing the surface loss of droplets. (Authors' abstract)

1035

Harris, W. B. 1957
SPREAD OF PARTICULATE CONTAMINATION FROM STACKS. Arch. Indus. Health, v. 15, Apr. 1957: 274-283. DLC (RC963.A14, v. 15)

The procedure used in calculating particulate concentration and deposition from elevated point sources is given including the means for approximating average concentrations and meteorological parameters. An analysis is given of the deposition of particles by free fall and wash-out by rain. Results are also presented from 2 long-term studies of the accumulation of materials on the ground from stack discharge. Studies indicate some deviation from the theoretical in that the deposition curves have a steep slope and a higher maximum occurring closer to the stack than theory would predict. Tables and illustrations are included.

1036

Hart, W. B. 1956
POLLUTION ABATEMENT IN THE PETROLEUM INDUSTRY. (Paper presented at the 4th Annual Pennsylvania Clean Streams Conference, in Philadelphia, Pa., Nov. 3, 1955). Indus. Wastes, v. 1, Jan.-Feb. 1956: 110-113. DLC

In 1919 a trade association, The American Petroleum Institute, was formed; it has been a prime mover in the pollution abatement activities of the producing, refining, marketing, and transporting of petroleum and its products. The early activities of the Institute were concerned with oil pollution of water following the passage of the Federal Oil Pollution Act in 1924. In 1929 the Institute was divided into 3 divisions and it was the Committee for the Disposal of Refinery Wastes which early in its existence became active in questions of control of waste gases, vapors, and particulate matter. Procedures for prevention of the escape of noxious gases and particulate matter have been developed, and their application described. In this connection, there has been a very complete discussion of the design and application of flares which act both as a safety release for too high pressures within the installation and as a means of burning off noxious gases which are usually heavier than air and would cause air pollution. Methods for conducting air pollution surveys have been developed as well as instruments for determining concentrations of noxious material. Some work has also been done on the production of tastes and odors, either directly or indirectly, in water supplies into which treated wastes have been released.

1037

Hartz, N. W. 1952
INSTRUMENTATION IN AIR POLLUTION. Air Repair, v. 2, Nov. 1952: 45-46, illus. DLC (TD883.A48, v. 2)

The author bases his article on the assumption that long-term exposure to minute concentrations of certain contaminants in the air may by themselves have a significant physiological effect on large numbers of people or contribute to the deterioration of health of persons who have previously acquired certain diseases. The correlation of these exposures with physiological response data will require years of study. In the meantime, the air pollution engineer must continue to determine the nature and extent of atmospheric pollution upon which these studies can be based. The ideal instrument for measuring aerosols in relation to long-range health hazards has yet to be developed. Such an instrument should be capable of recording its data continuously or at least at frequent intervals. These data should have some finite quantitation such as milligrams per cubic foot, and the sample should be collected in such a fashion as to be available for chemical analysis and particle size classification, so that the test results may be correlated with their effects upon man. It should be small enough to be transportable to alternate field testing sites and require substantially no maintenance. It should be operable from readily available power sources. Such an instrument should enable the air pollution engineer to accumulate considerably more data than are now available and these should be of

greater value for long range studies than the data tabulated in the past.

1038

- Heise, H. A., and E. R. Heise. 1957
EFFECT OF A CITY ON THE FALLOUT OF POLLENS AND MOLDS. Jour. Amer. Med. Assoc., v. 163, Mar. 9, 1957: 803-804. DLC (R15.A48, v. 163)

Pollen (particle) counts were made in the air above and about a city on the west shores of Lake Michigan at a time when the wind was blowing from the southeast with a velocity of 7 knots (13 km/hr). The survey was made during a temperature inversion resulting from warm currents of air rising from the city. The counts, involving *Alternaria* spores and ragweed pollen, were made at 2 different levels by airplane. The particle counts were found to be lowest north of the city, showing the combined effect of the air from the lake and rising air currents from the city. The conditions were duplicated experimentally by constructing a model city. It was shown that slightly warming the buildings caused the airborne spores (particles) to settle more densely over the rural areas surrounding the city. As a result, it is postulated that leeward parts of a city will be safer than the adjacent countryside with regard to radioactive fallout.

1039

- Heiss, J. F., and J. Coull. 1952
THE EFFECT OF ORIENTATION AND SHAPE ON THE SETTLING VELOCITY OF NONISOMETRIC PARTICLES IN A VISCOUS MEDIUM. Chem. Eng. Progr., v. 48, Mar. 1952: 133-140, illus. DLC (TP1.A6, v. 48)

The effect of orientation and shape on the settling rates of individual cylinders, rectangular parallelepipeds, and spheroids in a viscous medium can be predicted from the general correlation which has been expressed graphically following detailed studies of the particles. This information should prove useful in the design and operation of classification equipment if correction factors are applied for flocculation effects when hindered settling occurs on suspension. As the particle deviates from a shape of isometric proportions, the effect of orientation increases.

1040

- Hemeon, W. C. L. 1952
[AIR POLLUTION IN LOS ANGELES]. Air Repair, v. 2, Aug. 1952: 48. DLC (TD883.A48, v. 2)

Reference is made to the Second Technical and Administrative Report on Air Pollution Control in Los Angeles County, 1950-1951, which summarizes its 4-year program and deals largely with the eye irritation nuisance and crop damage problem. Evidence accumulates from this research that hydrocarbons (gasoline

line vapors, fuel burning, and waste incineration) may be the cause of both phenomena. Comparison between this report and that of the Stanford Research Institute by P. L. Magill, and R. W. Benoliel (cf. Air Pollution Bibliography, vol. 1, no. 439) suggests to the author a remarkably good agreement of figures, considering the magnitude of the system being appraised. The "reduced visibility" referred to in all the reports dealing with the Los Angeles smog problem, does not appear to be relevant.

1041

- Hemeon, W. C. L. 1952
NATURE OF THE AIR POLLUTION PROBLEM IN CITY OF NEW HAVEN. Industrial Hygiene Foundation of America, Inc., Pittsburgh, Pa. Report of survey, Sept. 1952. 67 p., illus. DLC-Sci

The results of a ten-month survey of the air pollution problems of New Haven, Conn., are given. The rate of dust fall was found to be below that of other cities of comparable size, and solid stack dust emission was well below the standards of industrial practice. The dust includes carbon in the form of petroleum coke and soot; this leads to the conclusion that contrary to expectations, the most important cause of dust reaching the ground levels in residential areas arises from the combustion of heavy fuel oil. Improved combustion techniques would minimize the visible smoke by reducing the soot content but not the total bulk of dust fall. Measures to improve conditions are described, and the nature of the burden that would be imposed on the community and on industry by ordinance regulations are discussed.

1042

- Hemeon, W. C. L. 1953
PROGRESS IN AIR POLLUTION CONTROL. Air Repair, v. 2, Feb. 1953: 119-122. DLC (TD883.A48, v. 2)

The progress of industrial and domestic air pollution abatement in the United States is reviewed. The shift in fuel use from bituminous coal to petroleum products has resulted in reduction in air pollution. Cities today face the problem of invisible, nuisance dust emissions and little can be accomplished controlwise until the pollutants have been adequately identified qualitatively and their sources pin-pointed.

1043

- Hemeon, W. C. L. 1956
AIR POLLUTION METHODOLOGY. Amer. Indus. Hyg. Assoc. Quart., v. 17, June 1956: 197-203, illus. DLC (RD963.A135, v. 17)

Air pollution methodology is discussed. It is pointed out that the pollution of air of cities and industrial areas is caused generally by dustfall, smoke, sulfur gases, sulfur dioxide and hydrogen sulfide, and miscellaneous odors. The first 2 of these can be described without

reference to their chemistry, physical rather than chemical methods of measurement being used. Methods of measurement for these, as well as for the sulfur gases, are discussed. Extensive data from studies of continuous observations of various pollutants, indicate that continuous measurement of any 1 pollutant can provide a useful index of the variations in concentrations of all pollutants. Identifying sources of pollution and assessing their relative importance is another phase of air pollution methodology. Under this heading, micrometeorology, emissions from 1 stack, tracer techniques, and the refractive index spectrum as a dust examination method are discussed.

1044

- Hemeon, W. C. L. 1957
AIR POLLUTION PROBLEMS OF THE STEEL INDUSTRY TECHNICAL COORDINATING COMMITTEE T-6 STEEL REPORT. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 62-67. DLC (TD883.A48, v. 7)

Dust emissions from blast furnaces are of 2 potential types: (1) residual dust in blast furnace gas which would pass to the atmosphere in the flue gas from the combustion of the gas; and (2) the escape dust-laden gas from the bleeder openings of the furnace. Primary gas washers consist of simple-type water scrubbers that remove approximately 90% of the entering dusts. The secondary stage consists of wet-type Cottrell precipitators, highspeed disintegrators, and Theissen disintegrators. Washing coal before charging to coke ovens reduces ash and sulfur content. Operating procedure and improvements to reduce dust emissions are discussed. Included is a complete outline of the blast furnace process.

1045

- Hendrickson, E. R. 1956
SAMPLING PROCEDURES AND REPORTING RESULTS. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ..., Sept. 1956, p. 17-20. DLC-Sci

A discussion is presented of pollutant sampling, the heart of air pollution research and investigation. Factors which must be considered in establishing a sampling program include: (1) purpose of the samples; (2) materials to be sampled; (3) precision required; (4) ranges of concentration of contaminant; (5) limitations of analytical procedure; (6) physical limitations and efficiency of collection; (7) location and number of sampling points; (8) rate of sampling; (9) duration of sampling period; and (10) meteorological conditions preceding and during sampling. It is pointed out that "additional studies and standardized procedures are ... urgently needed in calculating and reporting the results of analyses." The results of tests and surveys are reported in a variety of units, e.g., expressed as ppm (or similar units) with no indication whether by weight or volume. Often, the temperature and pressure to which the calculations have been adjusted are not stated. It is suggested that the results of air pollution surveys be presented in units

of milligrams or micrograms of pollutants (aerosols or gases)/cu m of air rather than converting to the corresponding proportional unit.

1046

- Hendrickson, H. M. 1953
AIR WASHER PERFORMANCE ANALYZED ON THE PSYCHOMETRIC CHART. Heating and Ventilating, v. 50, July 1953: 92-103. DLC (TH7201.H4, v. 50)

The selection of an air washer is difficult to make in view of the lack of required performance data. The method described in this article enables one to evaluate the performance to be expected from air washers under a variety of conditions, including heating, humidifying, and dehumidifying. The spray nozzle performance, saturating efficiency, and cooling-dehumidifying performance need be known in advance. The method is based on principles of heat transfer between air and water at various temperatures.

1047

- Hendrix, J. W., and others. 1953
INFLUENCE OF DATE OF COLLECTION AND DISTANCE FROM POLLUTION SOURCE UPON FOLIAR FLUORIDE CONTENT OF APPLE, CHERRY, AND PRUNE. (Paper presented at the 6th Annual Meeting of the Pacific Division of the American Phytopathological Society, Santa Barbara, Calif., June 17-19, 1953). [Abstract]. Phytopathol., v. 43, Oct. 1953: 587. DA

Analysis of 373 apple, prune, and cherry foliage samples collected in 2 periods in 1952 from a fairly wide area within an air pollution area near Spokane, Wash., showed a range of foliar fluoride from 13 to 1,034 ppm on a dry-weight basis. The analysis revealed a relationship between fluoride content and plant species, date of collection (increases in Sept. over those of July), and source of pollution (average foliar fluoride decreased with distance away from an alumina reduction plant). The data failed to show a consistent relationship between fluoride content and degree of plant injury recorded at the time of sample collection.

1048

- HERE'S AIR POLLUTION HELP. Petroleum Refiner, v. 35, Aug. 1956: 156. DLC (TP690.A1.P4, v. 35)

A table shows the typical and most effective control equipment and techniques applied in industrial processes, incineration, and automobile exhausts to reduce air pollution. The subjects treated briefly include controls, principle involved, pollutants controlled, and circumstances under which each type of control is used.

1049

- Hersey, H. J. 1953
NEW DEVELOPMENTS IN REVERSE-JET FILTERS.
 Amer. Indus. Hyg. Assoc. Quart., v. 14, Sept. 1953:
 177-182. DLC (RD963.A135, v. 14)

A method of cleaning collection bags of accumulated dust has been developed that enables the filtering process to continue uninterrupted. The porosity of the filter is maintained by a jet of high velocity air, applied in a reverse direction to the normal flow, which moves progressively over the filter medium. The method provides for a degree of automatic control which enables a constant volume regardless of variations in the amount or properties of the dust. The value of control by pressure drop is illustrated by data. Treatments of the filter medium are discussed which add to the efficiency of the process. Self-adjusting blow rings of the reverse-jet offset such variables as tube stretch, and occasional unexpected high pressures. Such factors as redeposition of dust and accumulation of thick surface deposits lower the capacity of some filters. Solutions to these problems are given. Photographs, diagrams, and charts are included.

1050

- [Hewson, E. W., and others]. 1953
A STATEMENT ON THE PRESENT POSSIBILITIES OF APPLYING METEOROLOGY IN AIR-POLLUTION ABATEMENT. Bull. Amer. Meteorol. Soc., v. 34, Jan. 1953: 38-40. DLC (QC851.A6, v. 34)

The Air-Pollution Abatement Committee of the American Meteorological Society has outlined briefly some of the applications of meteorological information to problems of air pollution. These are discussed under the headings of the influence of regional weather and climate, the influence of local weather and climate, and the contribution of meteorology to the solution of specific pollution problems. Under the latter are city planning, plant location, plant design, and plant operation. In plant design, the shape and orientation of buildings and the stack height are especially influenced by meteorological factors. In plant operation, the varying output of contaminants, market fluctuations, special operations, and emergency precautions are considered.

1051

- Heyrovsky, J. 1952
DETERMINATION OF CARBON DISULFIDE IN THE ATMOSPHERE. (Paper presented at the Congress of Practical Polarography, and arranged by the Central Polarographic Institute of Prague, Bratislava, Czechoslovakia, Feb. 18 and 19, 1952). [Abstract]. Analyt. Chem., v. 24, May 1952: 915. DLC (TP1.I615, v. 24)

Carbon disulfide has been found to give well defined polarographic waves in practically all electrolytes. For the analysis of air a 10% solution of sodium sulfite is recommended, as it absorbs oxygen and

shows only the 2 waves due to carbon disulfide. The first of these occurs at the applied voltage of 1.0 v and the second, which is somewhat smaller, appears at 1.4 v, coinciding with that of formaldehyde. Air is slowly passed through the sulfite solution placed in a special 1-ml microvessel, being sucked by a small turbine. The quantity of 1 microgram of carbon disulfide in 1 ml is distinctly shown. With the same sensitivity, the depolarization effect of carbon disulfide is also shown oscillographically. These, as well as the polarographic effects, are different from those of hydrogen sulfide. (Author's abstract)

1052

- 1957
HI-VOLUME AIR SAMPLER WITH FILTER ADAPTER.
 Indus. Wastes, v. 3, Jan.-Feb. 1958: 9A. DLC

The Staplex Company, Air Sampler Division, Brooklyn, N. Y., has announced that a new, larger filter holder is now optional equipment with the Staplex Hi-Volume Air Sampler. Made of stainless steel and aluminum, it consists of a mounting collar extended to a rectangular opening. The mouth, protected by a screen accommodates 6 in. x 9 in. and 8 in. x 10 in. filter papers. Originally designed by the New York Office of the Atomic Energy Commission, the sampler has been widely used by government and industry to detect and measure airborne radioactive particles, dust, smoke, and smog, mine and factory air hazards, and for research and testing. The Air Sampler quickly "inhales" an entire area, indoors or out, measuring pollutants by means of deposits on filter papers. Approximately 50 filter type papers 4 in. in diameter have been used in the standard filter holder. The unit is readily portable. Filter papers and filters may be exchanged in the field for continuous testing. (Quoted in full)

1053

- 1957
HIGH EFFICIENCY. Smokeless Air, v. 28, Nov. 1957: 64. DLC (TD884.S855, v. 28)

Coal dust precipitators installed at the Aberaman "Phurnacite" plant achieve a collection efficiency of 99.93%. The precipitators incorporate a highly efficient chute-type receiving electrode, which is designed to slide the attracted dust down to the collecting hoppers and prevent it from re-entering the gas stream when electrodes are rapped.

1054

- 1953
HIGH PRESSURE WATER SPRAY METHOD REDUCES ACID MIST POLLUTION. Chem. and Eng. News, v. 31, June 8, 1953: 2438. DLC (TP1.C35, v. 31)

The Carbide and Carbon Chemicals Co. in South Charleston, W. Va., has installed a plant-scale acid recovery unit of 700 tons H_2SO_4 per day to which a high-pressure water spray is applied. The spent acid is concentrated in 5 air-blown concentrators. The unit is 95% efficient and has eliminated air pollution by acid

fumes. The operation costs amounted to \$39,000 per year and may reach \$60,000, if further possible modifications are made; the value of acid and heat recovery amounts to \$55,000 per year.

1055

Hill, E. F., 1958

W. A. Cannon, and C. E. Welling.
OXIDATION CATALYSTS REDUCE HYDROCARBONS
IN AUTOMOBILE EXHAUST GAS. SAE Jour., v. 66,
Jan. 1958: 36-37, illus. DLC (TL1.S5, v. 66)

At operating temperatures of from 550°F to 900°F, a vanadium oxide catalyst has been demonstrated to be reasonably tolerant of lead solids in exhaust gases, with effectiveness of more than 80% in the first 100 hr of testing. Metallic catalysts tested show that platinum is a remarkably effective catalytic material with non-leaded gasoline and that 100% hydrocarbon conversion was obtained for the duration of the test. Nickel never attained the efficiency of over 50% and gradually declined in activity. Three metal oxides were evaluated revealing that iron oxide has a low initial efficiency and rapidly declines in effectiveness, while copper oxide gives a high conversion, but only for a short time. Vanadium oxide appeared to increase in activity after a short time, and thereafter became stabilized at a conversion level of about 75-80%. Vanadium shows over 50% hydrocarbon conversion for 175 hr, with 3 ml per gal of tetraethyl lead in the fuel.

1056

Hill, G. R. 1952
ANTICIPATING AND PREPARING AGAINST POSSIBLE
INDUSTRIAL HAZARDS FROM AIR POLLUTION. Amer.
Indus. Hyg. Assoc. Quart., v. 13, 1952: 81-87.
DLC (RD963.A135, v. 13)

This discussion considers industrial plant operations that give rise to gases and fumes potentially harmful to foliage and livestock, investigations to obtain harmless stack emissions, and the method of recording the appearance of vegetation in the possible fallout range of effluents. It is pointed out that "the concentration of an effluent reaching the ground from a chimney varies inversely as the square of chimney height; the peak of concentration occurs about 10 chimney lengths from the base of the chimney; reduction in concentration extends some 50 chimney lengths, following which the concentration varies inversely as the square of the source." This ratio is bettered by the effect of wind at various levels. Turbulence is a very important factor in dispersing gases and varies with locality because of the differences in topography; local meteorology; frequency, duration, structure, and nature of calms; and temperature inversions. These influences should be studied in an area being considered for industrial construction. Test methods are discussed and illustrated, e.g., air-stratification photographs. Kodachrome pictures taken over a period of time are useful in determining the relationship of leaf discolorations and vegetation damage and the presence of industrial effluents.

1057

Hilst, G. R. 1957
THE DISPERSION OF STACK GASES IN STABLE
ATMOSPHERES. Jour. Air Pollut. Control Assoc.,
v. 7, Nov. 1957: 205-210. DLC (TD883.A48, v. 7)

The observations made from test data on the dispersion of stack gases in stable atmospheres are as follows: (1) the diffusive capacity of stable atmospheres is variable from one time to another and no set of diffusion parameters can be assigned to stable atmospheres per se.; (2) Sutton's diffusion model fails in the specification of the vertical diffusion rate; (3) the concentration of stack effluents, when measured over a grid fixed with respect to the ground, is decreased significantly by large-scale meander. Tables and formulas involved in dispersion calculations are given.

1058

Hipkin, A. S. 1957
CLEANING OF FUME FROM ARC FURNACES. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957).
Smokeless Air, v. 28, Winter 1957: 126.
DLC (TD884.S855, v. 28)

This paper deals briefly with the requirements of the Clean Air Act in relation to pollution by industrial processes. It provides information collected on pollution from furnaces, reviews experience of application of equipment to arc furnaces, and outlines types of fume-cleaning plants available. (Quoted in full)

1059

Hobbs, A. P. 1958
GAS ANALYSIS. Analyt. Chem., v. 30, Apr. 1958:
778-792. DLC (TPI.I615, v. 30)

A review of gas analysis methods and developments of analytical techniques is given. Methods for testing the content in air of oxygen, ozone, nitrogen, carbon dioxide, carbon monoxide, cyanide, sulfur compounds, halogenated compounds, olefins, acetylenes, methane, and hydrogen are discussed. Both laboratory and field methods are covered.

1060

Hodges, J. L. 1952
THE ROLE OF THE CITY IN AIR POLLUTION. Air
Repair, v. 2, Nov. 1952: 17-19, illus.
DLC (TD883.A48, v. 2)

A general discussion of the problems encountered by a city in fighting air pollution is presented. In order to prevent air pollution from transgressing city boundaries, sensible and practical laws are to be enacted, that can be administered and enforced effectively. A further requirement is a department staffed with capable and trained personnel, and free of political influence. The head of a smoke abatement or air pollution

control division must have the following qualifications: primarily, he should be an expert and have practice in combustion engineering, be a capable administrator, a diplomat, and a good public speaker. A city air pollution control department must earn the confidence of industry and gain their cooperation. Long-range programs are recommended, about 3 years for smoke abatement, and 5 years for substantial reductions in dust and fume emission. There is a lack of personnel experienced in flue dust measurements. Mechanical equipment is to be designed to remove dust, fumes and vapors. Lower and correct standards of tolerance are to be set up for noxious fumes.

1061

- Holl, W., and R. Mühleisen. 1955
A NEW CONDENSATION NUCLEI COUNTER WITH CONTINUOUS OVERSATURATION. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 21-25, illus. DGS

By mixing atmospheric air, saturated water vapor, and hydrochloric acid, a water vapor supersaturation corresponding to that in the Scholz-nucleus counter is formed. The density of the fog formed is related reproducibly to the number of condensation nuclei/cu cm, and can easily be measured by photocells. (Authors' abstract)

1062

- Holl, W., and R. Mühleisen. 1955
ON THE EQUILIBRIUM OF IONIZATION IN AIR CONTAINING NUCLEI. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata*, v. 31, May-Aug. 1955: 115-118, illus. DGS

Simultaneous measurements of the concentration of condensation nuclei and of the positive and negative ions in the atmosphere were made on the outskirts of large cities. As a result, the following formula was evolved:

$n:M^{1/2.3} = a$ constant, where n = number of small ions, and M = sum of the charged and uncharged nuclei. This formula was applied to the behavior of condensation nuclei.

1063

- Holt, P. F. 1952
THE MASS CONCENTRATION OF AIR-BORNE DUSTS: USE OF DIMETHYLTEREPHTHALATE AS A FILTER BASE IN ITS DETERMINATION. *Metallurgia*, v. 45, Mar. 1952: 156-157, illus. DLC (TN1.M425, v. 45)

Naphthalene filters developed by Briscoe and co-workers are described. The filters have been improved by the author through addition of an electrical sampling pump,

so that continuous attention of the operator is not required. It provides an easy method of taking atmospheric dust samples in the field for determining dust concentrations. However, these filters cannot be used with air volumes greater than 30 liters, because of too rapid disintegration. The use of dimethylterephthalate as a filter base was investigated and proved very satisfactory. The filter showed no disintegration or loss of weight after a long period of use. The substance, a white crystalline solid, is chemically inert under normal conditions, insoluble in water and non-hygroscopic. The pads can be disposed of by sublimation at 105-110°C., leaving the dust. The preparation of the filters (filter holder and spring loaded compressor) is the same as for the naphthalene filters. A compression force of 10 kg. is applied directly, producing a filter of high resistance. A new vacuum hot plate for the sublimation of volatile filter bases is described, which constitutes an improvement over an earlier model. Several samples (up to 20) may be heated in it in one run, the vacuum being provided by an electric pump. If put in at night, they are ready for weighing in the morning. Further modifications are being attempted.

1064

- Houdry, J. H., and C. T. Hayes. 1957
VERSATILITY OF OXIDATION CATALYSTS FOR INDUSTRIAL AIR POLLUTION CONTROL. (Paper presented at the 20th Annual Meeting of the Air Pollution Control Association, held at St. Louis, Mo., June 2-6, 1957). *Jour. Air Pollut. Control Assoc.*, v. 7, Nov. 1957: 182-186. DLC (TD883.A48, v. 7)

The presence of metallic oxides and other non-combustible contaminants, which are known as catalyst poisons, in waste gases tends to limit the use of catalytic installations to those wastes which are relatively free of catalytic poisons. In this paper several instances are discussed of the successful use of catalysts which are being used in the presence of materials generally believed to be deterrents to catalytic oxidation. A very active and stable catalyst is able to withstand the presence of contaminating agents far more efficiently than one which is less active. The catalytic element used in the installations described is commercially known as the Oxycat. In the first instance considered, a resinous binder is applied to rock wool or Fiberglas. Stainless steel screens are installed in series, between the preheat burner and the catalyst bed, to take out the major part of the entrained threads. The screens are easily removed for cleaning; the catalytic elements can be cleaned without being moved by blasting compressed air through the bed. In a second installation--a catalytic cracking unit in preparation of high octane gasoline--the bits of cracking catalyst dust or beads from the processing are removed as much as possible by precipitators or cyclones installed ahead of the Oxycat units. An even and low velocity of the gases over the units reduces greatly the erosion caused by the extremely abrasive nature of the contaminant material. The third example is that of carbon black manufacturing processes in which the tail gases contain large quantities of combustibles. Preheating to 600°F. after the introduction of air, brings about oxidation of the combustible gases

and some of the particulate carbon black. There is no evidence of this being a catalytic action rather than mere oxidation of carbon black due to contact with the hot surface of the Oxycat. Checkerbrick in the hot (1600°F) air stream completes the oxidation of the carbon black. The fourth installation is one in which the tail gases from a phthalic anhydride process are catalytically oxidized to eliminate an air pollution problem.

1065

1952

HOW CLEVELAND AIR POLLUTION CONTROL IS SET UP. Air Repair, v. 1, May 1952: 39-40.

DLC (TD883.A48, v. 1)

The Division of Air Pollution Control (Cleveland, Ohio) is divided into 3 bureaus that function under the Commissioner. The Bureau of Smoke Abatement has controlling jurisdiction over all combustion devices with the exception of individual homes and row houses. It also issues permits of operation for new and existing installations. The Bureau of Industrial Nuisances monitors emissions of all types from industrial process operations. The Bureau of Industrial Hygiene is responsible for the health aspects of environment in mills, factories, and other places of employment. The Division also maintains a laboratory that handles routine and specialized investigations for all 3 bureaus.

1066

How, M. E.,

1958

R. W. Kear, and G. Whittingham.

THE FORMATION AND BEHAVIOUR OF SO₃ IN A SMALL-SCALE PULVERIZED-FUEL-FIRED FURNACE. Jour. Inst. Fuel, v. 31, Feb. 1958: 71-78.

DLC (TP315.I6, v. 31)

The paper discusses the effects of combustion, ash content, coal size, and the presence of treated steel and refractory surfaces on the corrosive nature and dewpoint characteristics of flue gases. The results show that the corrosiveness of the flue gases reached a maximum at 12.5% carbon dioxide (45% excess air). Variations in the fineness of grinding was found to have only a limited effect on the amount of sulfur trioxide produced. The removal of most of the dust from the combustion products increases the corrosive nature of the gases. The introduction of additional clean steel surfaces into the gas passages produced no change in the acidity of the gases; but the presence of rusty steel caused a temporary increase. Coating the interior of the furnace with lime had no effect on the dewpoint characteristics of the flue gases.

1067

HOW MUCH SULPHUR DIOXIDE? DIFFERENT FUELS COMPARED. Smokeless Air, v. 28, Winter 1957: 118.

DLC (TD884.S855, v. 28)

Comparisons are made of sulfur dioxide emissions from coal, coke, town's gas, kerosene, gas oil, and heavy

fuel oil. The basis of comparison is the SO₂ emitted in the production of one useful therm. Consideration is given to the calorific value and combustion efficiency. A method of calculation is described. Coke has been found to have the highest emission. However, this applies to industrial boilers only, but not -- contrary to coal -- to domestic open fire use, where the higher efficiency of coke will equalize the relative emissions.

1068

1955

HYDROCARBONS NOT ALONE. Chem. and Eng. News, v. 33, Oct. 3, 1955: 4175-4177.

DLC (TP1.C35, v. 33)

Hydrocarbon oxidation products, as well as the hydrocarbons themselves, react to yield ozone. The determination of relative ozone-forming capacity of 50 such compounds, including acids, aldehydes, alcohols, and ketones is discussed. Primary hydrocarbon pollutants are oxidized to form smog constituents and oxidation products, which are oxidized in turn to form more smog constituents. A reduction of air-borne hydrocarbons and oxides of nitrogen by 50% each, would reduce the smog-forming potential by approximately 75%. Physical methods have verified this chemically determined smog mechanism with some exceptions; thus ozone and formic acid were among the products identified, but no aldehyde was found. Free radicals, formed by the absorption of many substances in urban atmosphere, react with oxygen in sunlight to produce ozone. It appears that free radical concentration in urban atmosphere approaches 10-100 parts per one hundred million. It is suggested that the mechanism of the addition of free radicals to double bonds in polymerization reactions cause eye irritation and plant damage produced by smog. Ozone formation from the photolysis of nitrogen and from olefins with internal double bonds is discussed. Catalytically cracked gasolines and automobile exhaust vapors from catalytic types are found to contain substantially more of the oxidant yielding olefins than thermally cracked gasolines and gasoline vapors.

1069

Ibach, M. J.,

1954

H. W. Larsh, and M. L. Furcolow.

ISOLATION OF HISTOPLASMA CAPSULATUM FROM THE AIR. Science, v. 119, Jan. 8, 1954: 71.

DLC (Q1.S35, v. 119)

Portable venturi scrubbers were used to collect air samples within a chicken house on a farm in Kansas where an epidemic of histoplasmosis had occurred in a farm family. A goetz Millipore filter was used to collect any material from the distilled water in which the air was washed. Sterile techniques were used throughout, and 5 of the 13 samples taken (at heights of 2 or 5 ft from the floor) were shown to contain Histoplasma capsulatum.

1070

1954

INCREASE IN WORKS INFRACTIONS. BUT ACT'S PENAL CLAUSES NOT INVOKED SAY ALKALI INSPECTORS. Chem. Age, v. 71, July 24, 1954: 177-180.

DLC (TP1.C33, v. 71)

A statistical survey of infractions of regulations and improvements found in chemical plants during 1953 is reviewed. At Battersea Power Station 4,540 out of 7,660 tons of sulfur contained in 823,000 tons of coal escaped into the atmosphere in form of oxides, mostly in very dilute concentration. Manufacturers of selective weed killers had achieved correction of former noxious emissions. Following significant contamination of both soil and vegetable produce with selenium, the limit of permissible atmosphere concentration was set below 1 mg/m³. Discoloration of paints at an industrial village, traceable to hydrogen sulfide, was greatest in areas adjacent to streams of water. It was suggested that iron oxide and other dust in the air settling on the surface of paints might become converted to iron sulfide. Infractions in superphosphate process were due to any of the following causes: to alteration in the exhaust rate of gas through the scrubbers, to overloading and infrequent cleaning of the scrubbers, to failure of the booster pump to ensure adequate pressure at the water sprays, or, generally, to deterioration of the gas scrubbing system.

1071

1952

INDUSTRIAL HEALTH MEETING DRAWS 2000 ATTENDANCE. Heating, Piping, and Air Conditioning, v. 24, Aug. 1952: 84. DLC (TH7201.H45, v. 24)

A joint meeting on problems of industrial health was held in Cincinnati. The groups participating in the conference included the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, the Industrial Medical Association, the American Association of Industrial Nurses, the American Association of Industrial Dentists, and the U. S. Atomic Energy Commission. Papers related to air pollution were presented. Topics included in the discussion were air sampling, air cleaning and collection of toxic substances in the field.

1072

1953

INDUSTRIAL HYGIENE FOUNDATION. Heating and Ventilating, v. 50, Jan. 1953: 140-142. DLC (TH7201.H4, v. 50)

A brief report of the proceedings of the 17th annual meeting of the Industrial Hygiene Foundation is presented. The discussions included five categories: legal, chemical, engineering, general, and air pollution. The chemical-toxicological conference centered around gases resulting from fires and hot processes, while the engineering conference discussed the control of metal fumes. At the latter conference as well as at the afternoon general meeting, a paper on the present status and recent developments in air pollution was presented. Special attention was given to the effect of conversion of

exhaust mechanisms, fuels, and combustion methods on the nuisance and health aspects of air pollution.

1073

Ingram, W. T. 1952
AIR POLLUTION SURVEYS. Modern Sanitation, v. 4, Dec. 1952: 61-67. DLC (TD1.M6, v. 4)

The two forms of fluid pollution, gaseous and liquid, have been intertwined for hundreds of years and continue a close relationship currently. The industrial wastes engineer of the near future can anticipate participation in air pollution studies and surveys as a field routine. Some of the problems of air pollution surveys are discussed: questions relative to purposes of the survey; suggested procedures for the conduct of a field survey; problems introduced when planning a sampling program; consideration of the non-standard nature of present sampling techniques and methods; and the data required in an informative industrial inventory.

1074

1957

IMPINGEMENT BAFFLE-PLATE SCRUBBERS. Chem. Eng. Prog., v. 53, Sept. 1957: 78, 86, 88, illus. DLC (TP1.A6, v. 53)

Applications of impingement baffle-plate scrubbers in cleaning industrial gases are outlined. Gases enter the lower section of the scrubber where low pressure sprays humidify and strip the gas of coarser dust particles. The impingement baffle plate stage, which is flooded with water or some other scrubbing liquid, completes the cleaning. The mixture of gas, liquid droplets, and dust particles attains a high velocity (about 100 ft/sec) while passing through the baffle plates. Applications of the process include the removal of solids and tar from reform gas, cleaning and cooling of gases from fluidized-bed sulfur car roasters, and sulfur dioxide absorption. Operating data for the applications are included.

1075

1952

IMPROVED SMOKE TESTER. Heating, Piping, and Air Conditioning, v. 24, Dec. 1952: 178. DLC (TH7201.H45, v. 24)

An instrument, the True-Spot Smoker tester, has been manufactured. Flue gas samples are drawn into the sampler through a flexible tube with the aid of suction. The smoke in the sample decolorizes filter paper in the instrument. The degree of discoloration is an index of the quantity of smoke and can be measured by comparison with standards.

1076

1954

International Joint Commission. Technical Advisory Board on Air Pollution, Detroit, Mich.

REPORT OF RESULTS OF SAMPLING THE ATMOSPHERE IN THE DETROIT RIVER AREA DURING 1952. International Joint Commission. Technical Advisory Board on Air Pollution, United States Section, Detroit, Michigan. Jan. 1, 1954. 156 pages. DPH

This report presents the environmental and meteorological findings, obtained in a continuing appraisal of environmental air pollution on the United States side of the international boundary of the Detroit River. These findings for the 1952 period are correlated with those obtained in 1951. The two principal types of instruments used in the 1952 studies were high-volume air samplers using pleated filters to collect airborne particulate matter (with the samplers mounted on power poles ten feet from the ground), and two Thomas automatics (in mobile laboratories) to record sulfur dioxide concentrations. During 1952, spectrographic analyses were made of 4,675 samples secured with the Owens automatic air filter; 18,500 one-half-hour sulfur dioxide readings were obtained and tabulated. The median weights for total particulate matter ranged from a low of 170.8 to a high of 401.7 micrograms per cubic meter. When sampling stations were arranged according to decreasing median weights, most sampling stations were found to occupy similar positions in 1951 and 1952. The fluctuation in concentration was greater at any individual station than between stations, similar to the findings in 1951. In general there was no significant change from 1951 to 1952 in the weights of airborne particulate matter, but in 1952 there was a slight increase (from 80.1% to 81.7%) of the samples which were within the range of 0.0 to 400.0 micrograms per cubic meter of air. Major high and low values of total particulates occurred, in general, on the same dates at all stations. Total particulate matter from the air samplers was analyzed spectrographically to identify 22 elements qualitatively and semiquantitatively. Median values of 3.6, 2.4, and 1.7 micrograms per cubic meter of air were found for aluminum, iron, and silicon, respectively. Values ranging from 0.0008 to 0.9 micrograms per cubic meter of air were found for vanadium, tungsten, nickel, bismuth, chromium, barium, molybdenum, titanium, tin, copper, manganese, zinc, lead, and magnesium. Antimony, cadmium, cobalt, and beryllium were generally either absent or in trace quantities. Like the median total weight values, the median values for the elements remained quite constant for the two years. With due exceptions it was found that the airborne particulate matter contained higher concentrations of the elements analyzed than did soil samples; but in both groups of samples calcium, aluminum, iron and silicon composed 90 percent of the weight of the 22 elements. There were appreciably heavier concentrations of particulate matter in the samples collected on Wednesdays over those collected on Sundays; there was, however, little difference in the average total weight of the twenty-two elements between the two days. Regardless of the variation in the weight of the particulate matter, the quantities of the elements present were relatively constant irrespective of whether light or heavy pollution occurred. It was therefore apparent that constituents other than those analyzed were present in greater quantities when the pollution was high than when the pollution was low; these probably include a substantial amount of

organic constituents. During a period of higher-than-normal total air pollution which resulted in distressing effects upon the community, none of the individual inorganic elements determined increased sufficiently to be considered a pertinent factor. Air filter samples obtained in a residential area and those obtained in a downtown area followed the same general pattern, indicating that there was a probable rhythmic pattern associated with the rise and fall of particulates regardless of sampling location in the Detroit area. The average sulfur dioxide concentration for the year 1952 was 0.06 ppm, with each day of the week also showing the same average value. Monthly average sulfur dioxide concentrations were determined. The greatest percentage of peak values of sulfur dioxide occurred between the hours of midnight and 3:59 A.M., while the lowest percentage occurred between 4:00 and 7:59 P.M. During 1952, the highest momentary sulfur dioxide concentration was 2.40 ppm in July. A meteorological study of 1952 revealed that, in general, it was typical of the climatology of the area. Periods of high pollution were found to be concurrent with light winds. Rapid cleaning of the air was associated with increasing wind speed. Periods of high particulate pollution tended to occur during abnormally warm weather, while periods of low pollution tended to occur during abnormally cool weather. Particulate pollution was highest with south through west winds and lowest with north through east wind flow. No evidence was found from the study to either support or refute the theory that rainfall alone could effectively reduce particulate pollution.

1077

1955

International Joint Commission. Technical Advisory Board on Air Pollution, Detroit, Mich.

REPORT ON 1953 ENVIRONMENTAL STUDIES IN THE DETROIT RIVER AREA. Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. April 1, 1955. 56p. DPH

This is the third of a series of annual reports, presenting the results of work carried out during 1953, of an appraisal of environmental air pollution on the United States side of the international boundary of the Detroit River. The highest concentration of suspended particulate matter in the collected samples was 1012 micrograms per cubic meter of air in an industrial area, while the lowest was 20 micrograms per cubic meter of air in a residential area. The concentration of the majority of samples was found to range between 100 and 300 micrograms per cubic meter of air. In general, the concentration of particulate matter was not as high during the heating season as during the non-heating season. Confirming earlier findings, fluctuations in the quantity of particulate pollution varied more widely at a single station than they did between stations, with wind-blown surface material being an important factor. A weather index has been developed which, with further study, may prove to be a valuable tool in studying atmospheric dispersion. Spectrographic analyses of the suspended particulate matter of a few samples indicated that the concentrations of the elements were generally about the same as they had been in the past. Sulfur dioxide concentrations were generally higher at elevations of 125 feet above the ground than at ground level.

Although the data were not statistically significant, concentrations of particulate matter were found to be higher at ground level than at 125 feet above ground. Concentrations of organic particulate matter did not appear to be very different at the two levels. Particulate matter concentrations for the city as a whole have increased during each of the past four years, while sulfur dioxide concentrations have remained constant, but have varied widely from place to place. Ozone concentrations were found to be not nearly as high in Detroit as they are in Los Angeles. There was some indication that radon concentrations might be used as an index of the atmosphere's ability to disperse pollutants. Serious damage to vegetation was only found in areas close to sources of large quantities of atmospheric pollution. There is no indication to date that vegetation injury, either to foliage or to growth, can be used as indicators of pollution damage.

1078

- Jackson, R. 1957
MEASUREMENT OF DUST IN FLUE GASES. (Abstract of paper presented at the Conference of The Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 127.

DLC (TD884.S855, v. 28)

The work described is limited to the measurement of dust flues and ducts. The related aspects of atmospheric pollution and deposition are dealt with in other papers and are not discussed here. The tests described cover only a small part of the dust sampling requirements of the iron and steel industry. The purpose of the investigations was to determine the applicability of the techniques to a few problems typical of many existing in the industry, and to provide quantitative information about the emission from different forms of plants. The trials were neither intended to define the emission with complete precision nor to give guidance on the operation of the plant, but it is felt that the information obtained is accurate, of value to the plant operators, and shows the way by which more extensive data may be obtained. (Quoted in full)

1079

- Jacobs, M. B., 1957
and others.
DETERMINATION AND MEASUREMENT OF PARTICLES IN CITY ATMOSPHERE. Amer. Jour. Publ. Health and Nations Health, v. 47, Nov. 1957: 1430-1433.
DLC (RA421.A41, v. 47)

A method of measuring particle size and counting dust particles in outdoor city air and in non-workroom conditions is described. It consists in passing a known volume of air through a Millipore filter, placing this on a slide, adding a drop of cedar oil, and counting and measuring the particles with the aid of a microprojector. Experimental results indicate that more than 80% of the particles suspended in outdoor city air are in the range of about 0.5 to 1 micron. Tables are included.

1080

- Jacobs, M. B., 1958
and S. Hochheiser.
CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR. Analyt. Chem., v. 30, Mar. 1958: 426-428.
DLC (TP1.I615, v. 30)

Nitrogen dioxide is determined in air in the presence of much higher concentrations of sulfur dioxide on an hourly basis by using an automatic 24 hr sampler. Air is aspirated through a fritted-glass bubbler containing 0.1 N alkali solution. The absorbed nitrogen dioxide is determined colorimetrically as the A30 dye by using it to diazotize sulfanilamide in phosphoric acid and then coupling with it N(1-naphthyl)-ethylenediamine dihydrochloride. Nitrogen dioxide in the order of parts per hundred million of air can be determined. The sulfur dioxide present is also absorbed, but when oxidized to sulfate with hydrogen peroxide, does not interfere with the reaction. (Authors' abstract)

1081

- Jarvis, R. G. 1952
THE RAILWAYS AND COAL. Jour. Inst. Fuel, v. 25, Nov. 1952: 277-281.
DLC (TP315.I6, v. 25)

The article contains two passages on controlled firing of locomotives and on pulverized fuel. Good firing is obtained by methodical sequence of applications of coal at about 2-minute intervals--just the time needed for one application to burn through and the light smoke haze to clear before the next application is made. Each application should consist of 6 to 10 shovels full of coal, depending upon the rate of working. Correct use of the damper, blower and injectors is important. Admission of insufficient "top" air to the fire leads to smoke (incomplete combustion); excess air carries away heat. Tests of firing pulverized coal in locomotives have generally proved unsuccessful. The firebox volume of a locomotive was found insufficient to permit proper mixing of the particles of pulverized coal and air for complete combustion in the short time available as the fuel passes from the burner to the tube plate. Some success was reported in Germany in burning pulverized brown coal in locomotives, but experiments with black coal proved to be a failure in Germany as well as in England.

1082

- Jarvis, W. D., 1957
and L. G. Austin.
ROUTINE SURVEYS OF ATMOSPHERIC POLLUTION BY DUST AND SULPHUR DIOXIDE AROUND POWER STATIONS OF THE CENTRAL ELECTRICITY AUTHORITY. Jour. Inst. Fuel, v. 30, Aug. 1957: 435-446; discussion, v. 31, Jan. 1958: 32-41 (passim).
DLC (TP315.I6, v. 30)

The paper describes atmospheric surveys carried out to observe changes in the level of dust deposition and sulfur dioxide pollution in the vicinity of power stations.

The results show that the operation of power stations has only a small effect on the rate of dust deposition within a radius of two miles. The average concentration of sulfur dioxide at ground level has shown a trend towards a small increase with increasing power station output. The maximum contribution of the power station is believed to be less than 0.2 mg. sulfur dioxide/100 sq cm/day. Experiments of the Staythorpe power station have produced a significant correlation between output of sulfur dioxide and results obtained by measurements, if the averages were weighted for wind direction and distance from the source.

1083

- Jenne, D. E. 1957
VERTICAL TEMPERATURE PROFILES IN RELATION TO OTHER METEOROLOGICAL ELEMENTS AND TO THE AIR POLLUTION. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 31-35.

DLC (TD883.A48, v. 7)

Temperature profiles in the first 400 ft above ground surface near Hanford, Wash., are considered with respect to fog, sky condition, wind and warm and cold air advection. Fog in combination with atmospheric stagnation is characterized by a lapse condition from the surface to the top of the fog layer and by an intense inversion immediately above. This creates an unfavorable situation for industrial pollution of the air. An inversion extending from the ground upward for several hundred feet favors release of contaminants from elevated sources but not from the ground. Such an inversion tends to occur only at night. Temperature profiles identified with looping and fanning, although commonly associated with low wind speeds, may occur at speeds of 25 mph or more. Charts are included.

1084

- Jötten, K. W., 1952
and C. Van Marwyck.
THE PHAGOCYTOSIS OF INDUSTRIAL DUSTS IN TISSUE CULTURES. Brit. Jour. Indus. Med., v. 9, July 1952: 173-179, illus. DLC (RC963.A23, v. 9)

Phase-contrast microscopic methods were used to enumerate exactly the dust particles taken up by the phagocytes in tissue cultures. The 2 types of observation of the phagocytosis index were: (1) the relative proportions of total macrophages to those which had ingested particles; and (2) the number of dust particles taken up by 100 dust cells. Only the second index gives constant, measurable figures and striking differences for different dusts. Based on index 2, the protective mineral dusts were found to increase the phagocytosis of quartz particles as follows: bolus alba, 18%; sual (gypsum), 38%; and metallic aluminum (black), 58%; limestone, as well as metallic aluminum, had no effect. Evidence indicates that the greater the power of a protective dust to stimulate phagocytosis of quartz particles, the greater is its protective value against silicosis.

1085

- Johnson, C. L. 1952
ANALYSIS OF GAS MIXTURES CONTAINING OXIDES OF NITROGEN. Analyt. Chem., v. 24, Oct. 1952: 1572-1575, illus. DLC (TP1.I615, v. 24)

In studying oxidation of organic compounds with nitric acid, a method was required for the analysis of gas mixtures containing nitrogen, hydrogen, carbon monoxide, carbon dioxide, nitrous oxide, nitrogen dioxide, and nitric oxide or oxygen. A chemical method was developed in which total nitric oxide plus nitrogen dioxide is determined in one sample by oxidation to nitric acid with hydrogen peroxide, and titration of the nitric acid with standard caustic. In a second sample, nitric oxide and nitrogen dioxide are absorbed in 10 ml of a mixture of sulfuric and nitric acids nearly saturated with sodium sulfate. The mixed acid is titrated with permanganate. The percentages of nitric oxide and nitrogen dioxide are calculated from total nitric oxide plus nitrogen dioxide, and the permanganate titration. The residual gas from the mixed acid absorption is analyzed by absorption of carbon dioxide in potassium hydroxide solution and oxygen in alkaline pyrogallol, combustion of nitrous oxide with added excess hydrogen, and combustion of hydrogen and carbon monoxide with added excess oxygen. Nitrogen is determined by difference. Results are believed to be accurate to $\pm 1.0\%$ absolute for all components except nitrogen and possibly hydrogen. Organic vapors may interfere. The method should be useful wherever gas mixtures containing oxides of nitrogen are to be analyzed. (Author's abstract)

1086

- Johnston, H. S. 1956
PHOTOCHEMICAL OXIDATION OF HYDROCARBONS. Indus. and Eng. Chem., v. 48, Sept. 1956 (Pt. 1): 1486-1491. DLC (TP1.I6, v. 48)

Photochemical reactions in the atmosphere cause eye irritation and plant damage and lead to the formation of ozone. Hydrocarbons and their oxidation products are the components of photochemical reactions. In smog, free radicals which combine through bimolecular collisions are produced. The reactivity of free radicals suggests that they are important primary irritants. Discussions are presented of reaction rates, light absorption conditions, molecular mechanisms, oxidation mechanisms, and order-of-magnitude calculations. Steady-state partial pressures and half lives are estimated for sunlight absorption in various degrees.

1087

- Johnstone, H. F., 1956
and others.
EQUIPMENT AND PROCESSES FOR ABATING AIR POLLUTION. In Air Pollution Handbook, New York, McGraw-Hill Book Co., Inc., 1956. Section 13, p. 13-1 to 13-106, illus. DLC (TD883.M35)

This section describes equipment and processes used for abating air pollution, and the principles to be employed in selecting proper equipment for different conditions. The disposal of pollutants, the collection of aerosols, and the control of gaseous pollutants are considered. Tabular data are included.

1088

Jones, H. G., and J. T. Davies. 1957

EXTERNAL DUST DEPOSITION AND SULPHUR EMISSION. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957) Smokeless Air, v. 28. Winter 1957: 125.

DLC (TD884.S855, v. 28)

Methods of surveying dust and sulfuric gas emissions in the locality of the works [Steel Company of Wales, Ltd.] are described. The worst areas are within the works. It is suggested that these methods of assessment are essential to determine both the magnitude of the problem and the efforts of ameliorative action. (Quoted in full)

1089

Joor, W. E. 1955

WHAT YOU SHOULD KNOW ABOUT STORAGE TANKS. Oil and Gas Jour., v. 54, Nov. 14, 1955: 170-174, 179.

DLC (TN860.O4, v. 54)

An analysis of storage equipment for crude oil and its products is given from the standpoints of design and economics. Low-pressure tanks, variable-space tanks, cone-roof tanks, and different types of floating-roof tanks are considered. It is concluded that the floating-roof type of storage equipment is the most versatile and effective in overcoming hydrocarbon evaporation. Charts and nomograms are presented.

1090

Junge, C. E. 1956

RECENT INVESTIGATIONS IN AIR CHEMISTRY.

Tellus (Stockholm), v. 8, May 1956: 127-139.

DLC (QC801.T4, v. 8)

New results of chemical analyses of natural aerosol particles in Florida and in the Boston, Mass. area are presented. These data are compared with the results obtained earlier at various other locations. The continental and maritime components of NH_4 , Na, Cl, SO_4 , and NO_3 can be separated for 2 different size ranges, i. e., large particles (radius 0.08 micron to 0.8 micron) and giant particles (radius 0.8 micron to 8.0 microns). It is found that the continental influence on aerosols extends far over the ocean. The nitrate content of the particles presents an especially interesting problem, since it appears that the major part of NO_3 stems neither from a continental nor from a maritime source, but from a certain area along the coast. A comparison is made of the total amounts of material found in the

large and the giant particles of the various locations. Information gained from this comparison provides the basis for conclusions regarding the size distribution of aerosols. A pronounced difference between maritime and continental distributions becomes evident in this case. The concentrations of the corresponding gas traces of NH_3 , SO_2 , nitrogen oxides, and chloride components were measured in Florida and at other locations simultaneously with the chemical analysis of the aerosols. For most components, the concentration of these gas traces is considerably higher than that for the corresponding substances in the aerosols. The importance of these findings for air chemistry is discussed. (Author's abstract)

1091

Kane, J. M. 1952

OPERATION, APPLICATION, AND EFFECTIVENESS OF DUST-COLLECTING EQUIPMENT. Heating and Ventilating, v. 49, Aug. 1952: 87-98.

DLC (TH7201.H4, v. 49)

Dust-collecting equipment is available in many designs featuring wide variation in effectiveness, cost, operating and maintenance expense, space, arrangement, and materials of construction. These factors are discussed and used as a basis for comparing dust collectors. The collectors are grouped in 3 design classes; high efficiency, high cost; high efficiency, moderate cost; and low efficiency and low cost. Diagrams and tables are included.

1092

Kane, J. M. 1957

PUBLIC NUISANCE PROBLEMS FROM INVISIBLE STACK EFFLUENTS. APCA News, v. 5, Dec. 1957: 4-5.

DLC

Concentrations of dust from metallic grinding and machining processes, in which industrial air cleaning equipment is employed (usually of the dry centrifugal type) are spectacularly light. Quantities of contaminants from acid plating processes vary depending on such factors as (1) process employed, (2) type of acid bath used, (3) acid bath temperature, (4) agitation caused by the parts processed, and (5) quantity of air and hooding of the exhaust system. Nuisance quantities can be as low as 10 for 50 mg/l. Invisible effluents of salts sublimed from salt bath heat furnaces can cause damage to metallic surfaces. Boiler fly ash is considered the main air pollution contributor. A coal consumption of 200,000 tons would emit 2400 tons/mo or 20 ton/mi²/mo assuming that the usual standard abatement conditions of 85 lb/1000 lb of gas corrected to 12% CO_2 existed.

1093

Kanter, C. V., R. G. Lunche, and A. P. Fudurich. 1957

TECHNIQUES OF TESTING FOR AIR CONTAMINANTS

FROM COMBUSTION SOURCES. Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 191-199, illus.
DLC (TD883.A48, v. 6)

In most air-pollution-control studies of combustion sources, attention has been focussed largely on the amount of particulate matter discharged. However, in the testing program of the Los Angeles County Air Pollution Control District (APCD), methods for measuring other contaminants in the gaseous state have been concentrated on. Among the contaminants considered are: sulfur dioxide, sulphur trioxide, ammonia, hydrocarbons, aldehydes, and oxides of nitrogen. The methods and procedures used, including sample calculations and data sheet information, are discussed in detail.

1094

Katz, M. 1956
CITY PLANNING, INDUSTRIAL-PLANT LOCATION, AND AIR POLLUTION. In Air Pollution Handbook, New York, McGraw-Hill Book Co., Inc. 1956. Section 2, p. 2-1 to 2-53, illus. DLC (TD883.M35)

The following subjects are treated in this review: (1) Industrial plant location and zoning; (2) planning for the future, e.g., in Detroit, Mich., Pittsburgh, Pa.; (3) organization and functions of air pollution control groups; (4) compulsory vs voluntary pollution abatement; (5) case histories of abatement efforts; (6) meteorology and pollution control; (7) topography and industrial-plant location; (8) effluents and air pollution control; and (9) dependence of control measures on nature of contaminants. Tabular data are presented.

1095

Kayse, J. R. 1953
GRAPHICAL SELECTOR FOR AIR CLEANERS. Heating and Ventilating, v. 50, July 1953: 80-83.
DLC (TH7201.H4, v. 50)

A table is presented which describes the types, sizes, and concentrations of dust particles that are derived from various sources including furnaces, abrasive cleaning processes, kilns, foundries, conveyors, and city atmospheres. Also presented is a table which relates efficiency of collectors to particle size. Filtration by electrostatic precipitation is best for the removal of ultramicroscopic particles (0.001-2 microns) while cloth arrestors and wet collectors are suitable for microscopic particles (2-10 microns). Cyclones of various types are suitable for the removal of larger particles.

1096

Kayse, J. R. 1957
AIR POLLUTION PROBLEMS FROM HIGH TEMPERATURE STACKS. Amer. Indus. Hyg. Assoc. Quart., v. 18, Sept. 1957: 253-260, illus.
DLC (RC963.A135, v. 18)

Collection equipment for applications involving hot and often moist corrosive gases containing appreciable quantities of submicron-size material should be of the wet fabric, or electrostatic type. Particle size, concentration, and temperature necessitate using the cheaper dry centrifugal separators as precleaners only, ahead of the more efficient secondary collectors. Neutralizing agents and protective coatings for equipment involved in cleaning stack gases at elevated temperatures involve higher expenses. The limitations of various dust collectors, when applied to high temperatures, are discussed.

1097

1956
KEEPING "CLOUDS" FROM THE HORIZON. Petroleum Engineer, v. 28, Oct. 1956: C13.
DLC (TN880.P44, v. 28)

Smoke abatement in an oil refinery flare stack is discussed. The Cities Service Oil Company, East Chicago, Ill. has overcome the problem of incomplete combustion in the stacks by admitting steam through several small tubes extending upward from the outside rim of the stack. The steam is sprayed into the mixture of hydrocarbons and air to give strong turbulence, bringing all stack combustibles into intimate contact with the oxygen of the air to give combustion without soot formation.

1098

Kehoe, R. A. 1952
EFFECTS OF INDUSTRIAL ATMOSPHERE ON WORKMEN AND ON COMMUNITY. Heating, Piping, and Air Conditioning, v. 24, May 1952: 122-125.
DLC (TH7201.H45, v. 24)

A non-technical discussion of the effects of atmospheric pollution on humans is presented. The sources of natural pollution include volcanos, geysers, swamps, caverns, dust storms, and pollen dissemination. Forest and grass fires also contribute to the total pollution. Non-industrial pollutants include those obtained by the burning of household fuels, garbage, trash, and vehicle fuels. Industrial pollutants vary considerably from source to source. Except in unusual circumstances, the unfavorable effect of atmospheric pollution is related to mild irritation, offensive odors, or a loss of the sense of well-being. The long-range effect of air pollution on health has not been adequately studied. Of particular concern is the dearth of knowledge relative to the effect of a combination of air pollution factors. Engineers attempting to control air pollution are at a disadvantage because they do not know what constitutes a hygienically undesirable concentration of air pollutants.

1099

Kehoe, R. A. 1952
HEALTH ASPECTS OF AIR POLLUTION. Air Repair, v. 2, Aug. 1952: 1-7, illus. DLC (TD883.A48, v. 2)

The author believes that there are contributory effects of air pollution on the discomfort of those who are already partially disabled by chronic disease. The severity of sinusitis, chronic upper respiratory disturbances, and asthmatic conditions seems to be affected by weather conditions which also influence local air pollution. In general, toxic effects are not attributable to a substance per se, but become manifest after threshold concentrations are reached. We have no evidence, other than a working hypothesis, that an increase in the incidence of pulmonary cancer, pneumonia, bronchitis and the like is due to air pollution. The composite picture of the atmosphere creates an exceedingly difficult problem from the experimental point of view. The significance of air pollution to the health of our population cannot be properly assessed until more detailed information on the industrial environment and on health effects of air pollution are available.

1100

- Kelley, A. L. 1954
FOG AND SMOG. (Paper presented to the Midlands Joint Advisory Council for the Abatement of Smoke and Atmospheric Pollution, Birmingham, Dec. 15, 1953). Smokeless Air, v. 24, Spring 1954: 137-141, 144, illus. DLC (TD884.S855, v. 24)

At present the weather services system of recording fog is based on surface visibility. If visibility falls below 1,100 yd, fog is recorded; when visibility falls below 200 yd it is considered to be thick fog, while below 50 yd it is dense fog. In discussing fog- and smog-formation, it is pointed out that the amount of water vapor which a mass of air can hold depends on its temperature. As it cools it cannot hold all its moisture in an invisible state, some of the vapor is condensed on the minute particles always present in the atmosphere, and it becomes visible as fog, dew, or rain. The temperature at about which this condensation takes place is called the dew point. The amount of water vapor present in a mass of air is expressed in terms of its dampness or relative humidity. When the earth loses heat by radiation at its surface and the air in contact with it becomes cooled, the fog which results is known as radiation fog. When a comparatively warm and moist air current spreads across snow-covered or cold ground, the fog which forms is called advection fog. This type of fog also occurs when 2 air currents, 1 warm and 1 cold, begin to mix. It seems to be thicker just above the earth's surface, and causes less inconvenience to road traffic than does radiation fog. Frequently as night falls there exists a layer of air above the ground in which the temperature is higher than the air above or the air below. This state of affairs is termed an inversion. If the inversion layer is fairly high its main effect is to cut off light; if, however, the inversion layer is low, the smoke gathers at the surface of the earth, reducing visibility and in certain cases making breathing difficult. If the surface humidity is low, a pure smoke fog results. The worst type of fog occurs when conditions favor the development of both water vapor and smoke fog, near the surface, forming smog. Observation of fog conditions in the Birmingham, England area over a 5-yr period indicates only very remote chances of a catastrophe occurring under smog conditions. It is noted, however, that the area is rapidly expand-

ing, and that this may not be the situation within a few yr.

1101

- Kemp, L. C., Jr. 1956
GREAT STRIDES MADE IN SMOKE AND FUMES RESEARCH. Petroleum Engineer, v. 28, Oct. 1956: C14-C16. DLC (TN860.P44, v. 28)

A review is presented of the progress made in air pollution investigations conducted by various research teams in the United States. Oxidant measurements, and SO₂ concentrations have been recorded for certain cities. The studies concerned with the mechanism of ozone formation give support to the postulation that nitrogen dioxide absorbs light to form NO and an atom of oxygen which combines with molecular oxygen to give ozone. The program includes tasks in analyzing atmospheric reactions by infrared light; tracing the path of stack gases; observing reduced visibility that results from reactions of hydrocarbon and ozone in the presence or absence of other materials; and isolating and determining the constituents of polluted atmospheres.

1102

- Kendrick, J. B., 1956
E. F. Darley, J. T. Middleton, and A. O. Paulus.
PLANT RESPONSE TO POLLUTED AIR. Calif. Agric., v. 10, Aug. 1956: 9-10, 15, illus. DA

Observations are prescribed, based on controlled fumigation experiments, regarding the effects of ethylene, herbicides, fluorides, sulfur dioxide, smog, and oxidized hydrocarbon contamination on plants. Plants exposed to these pollutants are most notably stunted and chlorotic when nitrogen soil levels are low. Injury to plants is also influenced by the temperature of the air during the perfumigation growth period. Protective measures applied to prevent injury are discussed. A table is included of plants known to be damaged by air pollution.

1103

- Kenneway, T. 1957
THE FULHAM-SIMON-CARVES PROCESS FOR THE RECOVERY OF SULPHUR FROM FLUE GASES. (Abstract of paper presented at the conference of The Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 127. DLC (TD884.S855, v. 28)

The process consists of the removal of sulphur oxides from flue gases, by scrubbing them with ammonia liquor derived from gas works of cokeoven plants, to produce a solution of ammonium sulphate, sulphite, bisulphite, and thiosulphate which, by autoclaving, can be converted to ammonium sulphate and sulphur. An account is given of the development of this process from early work on a central-heating boiler at Cheadle Heath

through pilot-plant work at Fulham Power Station, to the present plant on half-boiler scale now operating at the North Wilford generating station. As distinct from existing processes of flue-gas washing, which have been briefly reviewed, the outstanding advantage of the Fulham-Simon-Carves process is that it produces saleable products to offset the cost of operation; it also provides an indigenous source of elemental sulphur. (Quoted in full)

1104

- Kiffer, A. D., and L. G. Dowell. 1952
CONSTRUCTION AND OPERATION OF AN AUTOMATIC OZONE ANALYZER. *Analyt. Chem.*, v. 24, Nov. 1952: 1796-1798, illus. DLC (TP1.1615, v. 24)

Automatic equipment for continuously measuring and recording the concentration of ozone in a stream of gas is described. Its operation depends upon the absorption by ozone of a selected band of visible light at ozone concentrations in the range 0 to 10 mole-% or higher. (At concentrations greater than 10 mole-% the absorption tube should be shielded as a safeguard against possible explosion). Colored gases, e.g., chlorine, bromine, and nitrogen tetroxide, and fog or mist interfere with the analysis. The apparatus is reliable and relatively simple. It is useful for recording and controlling the concentration of ozone in the gas from an ozone generator. It is also helpful in carrying out chemical reactions of ozone by recording the concentration of the input ozone, and of ozone in the gas leaving the reaction vessel. (Authors' abstract in part)

1105

- King, E. J., V. Pash, and W. Weedon. 1954
COLORIMETRIC ESTIMATION OF SILICA WITHOUT REMOVAL OF PHOSPHATE AND IRON. (Paper presented at the 325th Meeting of the Biochemical Society, London, Jan. 16, 1954). [Abstract]. *Biochem. Jour.*, v. 65 (4), 1954: xlv. DNLN

Details of a colorimetric method for the estimation of silica in pneumoconiotic lungs are given. Silicate and phosphate both couple with molybdate in weak acid, but only silicomolybdate is reduced if the solution is first made strongly acid. Small amounts of tissue iron likewise do not interfere if sufficient phosphate is present. Good agreement was found between the results of tissue analyses by this colorimetric method and those by gravimetric methods.

1106

- Kitto, P. H., and D. G. Beadle. 1952
A MODIFIED FORM OF THERMAL PRECIPITATOR. *Jour. Chem. Metall. and Mining Soc. South Africa*, June 1952: 284-306, illus. DLC (TN1.C53, v. 1952)

A review and discussion of various dust sampling instruments are presented, followed by a detailed description of the authors' new modified thermal precipitator, which meets the requirements of the South African Gold Mines, is transportable, can be operated without special training, and has a self-contained power supply. This device can sample any desired amount of air, over any desired period. Once started, it requires no further attention, and there is no need to change cover-glasses between samplings. The samples it collects reproduce the approximate deposition of particles in the lungs and therefore give an indication of health hazards due to dust pollution. These samples can be treated as desired to remove various contaminants and examined in a variety of ways, yielding accurate and consistent readings. The instrument is described in full detail, with figures and tables.

1107

- Koritz, H. G., and F. W. Went. 1953
THE PHYSIOLOGICAL ACTION OF SMOG ON PLANTS. I. INITIAL GROWTH AND TRANSPIRATION STUDIES. *Plant Physiol.*, v. 28, Jan. 1953: 50-62. DA

The effect of synthetic smog (1-n-hexene plus ozone) on growth and transpiration of tomato plants and on elongation of etiolated pea sections has been studied. Use has been made of hidden damage (growth decrease in the absence of visible injury) to measure the effect of light, sucrose spray, β -naphthoxyacetic acid, and water supply on smog injury. Growth of tomato plants fumigated in the dark or light just following a 12-hr dark period or in the dark after 1.5 hr of light was unaffected by smog. Growth of plants fumigated in the light at mid-day or early afternoon was significantly decreased by smog treatment. Sucrose spray partially protected tomato plants against smog damage. β -naphthoxyacetic acid did not significantly affect the response of tomato plants to smog. Smog treatment did not affect the elongation of etiolated pea sections either in water or in 2,4-D solution. Tomato plants given limited water supply were resistant to smog damage while comparable plants receiving ample water were susceptible. Transpiration and water uptake rates of tomato plants were decreased by subjection to smog. Decrease was followed by recovery to slightly less than control rates. Subsequent fumigation caused repeated drops in transpiration rates followed by partial recovery. No direct correlation between stomatal openings and response of plants to smog was observed. (Authors' abstract)

1108

- Kotin, P. 1952
ORGANIZATION AND OPERATION OF A STUDY OF AIR POLLUTION IN RELATION TO EXPERIMENTAL CARCINOGENESIS. *Arch. Indus. Hyg. and Occupat. Med.*, v. 5, June 1952: 548-553, illus. DLC (RC963.A14, v. 5)

An investigation was carried out in the Los Angeles, Calif. area studying whole smog, both naturally and artificially produced, and individual components of

smog for the possible role of air pollution in the increasing incidence of primary lung cancer. An especially designed transparent plastic air filter for the collection of air samples was constructed, and is described in detail. Benzene extracts of soot samplings were painted on the skin of mice in tests of carcinogenicity. Individual hydrocarbons from atmospheric samplings were identified by standard chromatographic and spectrophotometric procedures. Of the hydrocarbons emitted into the atmosphere of Los Angeles, 99% of the total are identifiable as being from refining, production, and use of petroleum products. (Author's abstract in part)

1109

- Kramer, H. P. 1956
TRAINING. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 111-117. 1956. DPH

Air pollution is the newest subject included in the training program at the Sanitary Engineering Center in Cincinnati, Ohio, supplementing such subjects as Civil Defense, Milk and Food, Radiological Health, and Water Supply and Water Pollution Control. Because the basic training staff is small and has to be augmented by research personnel at the Center, the courses are given in Cincinnati. Field courses are not presented until after they have been carefully developed for presentation at home. Under the terms of the recent Federal Air Pollution Act, other training opportunities have been opened, offering a possibility for professional training to selected staff members or to selected individuals, who may elect careers in the field of air pollution. It is hoped that, in the course of this Seminar, new ideas on training needs in the field of air pollution will be advanced, which might be taken care of by the Center. A short informal discussion on the subject concludes the paper.

1110

- Kreutzberg, E. C. 1954
INDUSTRY'S AIR POLLUTION FIGHT INCLUDES... CARRYING THE BATTLE TO WASHINGTON. Steel, v. 135, Oct. 11, 1954: 70. DLC (TS300.I745, v. 135)

In view of the size and scope of the health problems involved and the economic hazards to industries (which are financially responsible), air pollution problems cannot be resolved through the efforts of individual companies. Sen. Homer Capehart's approach to the problem, advocating Federal support of research on new smoke abatement and antipollution equipment, seems to be a better solution.

1111

- Kristal, E., 1957
R. Dennis, and L. Silverman.
A STUDY OF A MULTIPLE VENTURI WET COLLEC-

TOR. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 204-213, illus. DLC (TD883.A48, v. 6)

An experimental model of a new type wet collector is described, each unit of which consists of single or multiple collection stages containing a Venturi tube and 2 spray generators. Because of the different manner in which the water is introduced, the unit is not directly comparable to the Venturi scrubber. Results of tests with representative aerosols under a variety of operating conditions are described, and a tabulation of comparative performance of the test model and several other wet collectors is presented.

1112

- Kropp, E. P., 1952
and R. N. Simonsen.
HOW OHIO FIGHTS AIR POLLUTION. Oil and Gas Jour., v. 51, July 21, 1952: 84-87. DLC (TN860.O4, v. 51)

The Cleveland refinery of Standard Oil Co. of Ohio has adapted a fog-filter-type scrubber for the removal of fatty acid odors, and for the absorption of sulfur dioxide and hydrogen sulfide from air streams. The unit consists of 2 cylindrical spray chambers connected by a crossover duct. An exhaust blower, located at the outlet, draws the gases through the cylinders where the scrubbing medium is introduced through a number of fog nozzles. Results are given of tests conducted to determine the efficiency of the unit in removing the noxious gases. Dimensions and capacity of the experimental unit and the plant-size unit are given. A diagram of the unit is included.

1113

- Kugel, H. K. 1956
EQUIPMENT STANDARDS. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 50-60. 1956. DPH

Selection and installation of fuel burning equipment is discussed with regard to air pollution control. Two points of view are prevalent: (a) that it is only necessary to lay down standards for performance, and (b) that it is necessary to control the type of equipment that may be permitted to be installed and the work of installation. The author states his agreement with the latter. Various aspects concerning application for a building permit and for a boiler permit are described. All building plans except those for single family dwellings must first be checked for (1) boiler room size, (2) ventilation, and (3) stack area and height. The two functions of the stack to be considered are draft, and the nuisance consideration. On the larger jobs, especially, it is required that an information sheet be made out and in addition a slip for follow-up inspection of the job. At some time prior to the installation of either new or replacement equipment, a permit

has to be obtained for the installation of the boiler. --- Information is given on the installation of boilers, stokers, oil burners, and gas burners, incinerators, and ventilation equipment. Detailed regulations, fairly but firmly enforced, are a benefit to all concerned in preventing or eradicating air pollution from these sources. eradicating air pollution from these sources.

1114

Lane, H. 1952
N.A.P.E. APPROACH TO AIR POLLUTION IN LOUISVILLE, KY. *Air Repair*, v. 2, Nov. 1952: 42-45, illus. DLC (TD883. A48, v. 2)

The approach of the National Association of Power Engineers of Louisville, Ky. to air pollution is outlined. Since 1949 the Association has cooperated with the city engineer in controlling air pollution. They send a letter to each offender, offering advisory services free of charge, in order to alleviate the smoke problem. Two or more committee men are sent to the plant for inspection. After open discussion by the entire committee, and upon agreement on correctional methods, an advisory letter is sent to the plant management in question (excerpts from such letters are quoted). Quite often expenditures for improvements in the boiler room will prove to be sound business investments. In real hardship cases, where rebuilding an obsolete plant is economically impossible, inexpensive methods of alleviating smoke conditions can be prescribed. The Association seems justified when it asserts that "although we have been instrumental in aiding in abatement of many smoke problems, we have done nothing more constructive than to create an improved relationship between appointed enforcement officials and with the public in general and large scale consumers of fuel in particular".

1115

Langer, G., and S. Radner. 1957
EMISSION AND PERFORMANCE STUDY OF A PILOT PLANT ROTARY TYPE INCINERATOR (EXCERPTS). *APCA News*, v. 5, Oct. 1957: 4-5, 8, illus. DLC

Tests are described which determine whether or not a rotary-type municipal incinerator with limited pre-drying and ignition facilities would create a smoke nuisance, having met the other important requirements of good incineration. Incineration in this unit took place in a rotary drum with a straight through feeding. The ashes dropped into the pit of the combustion chamber at the far end while the fly ash and gases passed through a simple dust collecting system into the stack. In the dust collecting system, water was directed by a number of nozzles onto the damper plate to wash down the impinged dust. Fly ash particle size measurements indicated an upper limit of 300 microns. There was no smoke or odor problem. Tables are given of incinerator operation data. Dust loading in the stack was too high to be acceptable in most communities.

1116

Lapple, C. E. 1954
ELEMENTS OF DUST AND MIST COLLECTION. *Chem. Eng. Progr.*, v. 50, June 1954: 283-287, illus. DLC (TP1. A6, v. 50)

Dust and mist collection is concerned, in general, with the physical separation of particles, either solid or liquid, from the gas in which they are suspended. A summary of known types of dust-collection equipment, classified according to structural or application similarities, is given. These are discussed briefly under the headings: gravity settling chambers; inertial devices; packed beds; cloth collectors; scrubbers; electrical precipitators; air filters; sonic collectors; and thermic precipitators. The selection and design of equipment are discussed, together with information on estimates of particle size, particle concentration, and required collection efficiency.

1117

Larsen, S. J. 1952
CONTROLLED OVERFIRE AIR SYSTEM. *Air Repair*, v. 1, May 1952: 36-38. DLC (TD883. A48, v. 1)

The PliOjet overfire system, used to eliminate industrial smoke by inducing more complete furnace combustion, is described. The installation consists of a turbo-blower mounted just outside the furnace that delivers air through a manifold to jet nozzles which direct the air into the fuel box. By surveys, the most suitable number and placement of these nozzles can be determined so that the air to be delivered will completely cover and penetrate the fuel bed both in length and width. The air injected into the firebox provides the oxygen and creates the turbulence needed for a thorough intermixing of combustion gases. The PliOjet system can be adopted to manual, semiautomatic, automatic, and electronic methods of control. The system is economical in that it uses air, available in abundance without cost, and electricity to operate the turbo-blower, and can increase combustion efficiency as well as eliminate smoke at an installation cost of only a fraction of that involved in redesigning and rebuilding furnaces.

1118

Larson, G. P. 1952
MEDICAL RESEARCH AND CONTROL IN AIR POLLUTION. (Paper presented before the Engineering and Industrial Hygiene Section of the American Public Health Association at the Seventy-ninth Annual Meeting in San Francisco, Calif., November 2, 1951). *Amer. Jour. Publ. Health*, v. 42, 1952: 549-556. DLC (RA421. A41, v. 42)

There has as yet been no extensive clinical or laboratory research on the effects of air contaminants on public health. Aroused public interest and the increase of air contaminants in large industrial centers and densely populated areas have led to the creation of several state commissions to study the problem, fre-

quently with the public health officer making the investigation. Letters or phone calls from persons concerned with the effect of pollution or smog on health become a definite problem for the Air Pollution Control District of Los Angeles County, particularly during a time of heavy concentration of smog. Expensive and time-consuming studies would be necessary if a program of research is to be relied on to give the answers to medical questions. Contaminants are present in the atmosphere in such low concentrations as to make measurements very difficult. Where submicron dusts or fumes are involved, more fundamental research is needed before controlled experiments can be undertaken. Probably no one or two pollutants (of the more than 50 different substances released to the air and now known to have some relation to smog) will be revealed as affecting public health by themselves; any study of health hazards must consider both the single pollutants and the additive effect or synergistic action of various combinations of contaminants. Some of the equipment is pictured and techniques are discussed for measuring various pollutants in the Los Angeles area. Microchemical techniques have been developed for determining the concentrations of many items of interest to such research; two tables are shown giving concentrations of such materials in the Los Angeles area. Some of the experiences of the Los Angeles County Air Pollution Control District in the control of smoke, dust, fumes, and odors, are discussed. Although the problem is a major and expensive one, considerable information on medical aspects may be expected to result from the various control programs now underway and from others which are contemplated.

1119

- Larson, T. E., and I. Hettick. 1956
MINERAL COMPOSITION OF RAINWATER. *Tellus*
(Stockholm), v. 8, May 1956: 191-201.
DLC (QC801.T4, v. 8)

Analyses of 62 rainwater samples collected at the University of Illinois Airport near Savoy, Ill., showed that on the basis of equivalent concentrations, the chloride is equal to the sum of sodium and potassium. Sodium was 3 times the potassium. Calcium plus magnesium was 10 times the chloride, and equal to the sum of the bicarbonate and sulfate. The sulfate was equal to twice the sum of ammonium and nitrate. These results indicate salt from sea mist to constitute a negligible proportion of the mineral content. They also indicate the presence of air pollution by the combustion of fuel. (Authors' abstract)

1120

- Lavender, J. P. 1957
THE CLEAN AIR ACT, 1956: INITIAL STEPS FOR IMPLEMENTATION. *Royal Soc. for the Promotion of Health Jour.*, v. 77, Nov.-Dec. 1957: 774-779.
DLC (RA421.S3, v. 77)

The divisions of the Clean Air Act, 1956, passed by the British Parliament, are outlined and discussed.

Parts 1 and 2 are the introduction and appointed date for legal effectiveness, respectively. Part 3 contains sections relating to requirements for new furnaces and density meters, and to height specifications of chimneys. Part 4 establishes smoke control areas under local authority for the control of pollution from domestic and commercial chimneys. Parts 5 and 6 include sections of special cases such as regulations for colliery spoilbanks, and miscellaneous provisions, such as building bylaws and powers of authority for research and publicity.

1121

- Lawler, C. 1957
AIR POLLUTION CONTROL BY A SULFUR DIOXIDE SCRUBBING SYSTEM. *Jour. Air Pollut. Control Assoc.*, v. 7, May 1957: 29-31. DLC (TD883.A48, v. 7)

The Olin-Mathieson Chemical Corp., Little Rock, Ark., has developed a sulfur dioxide scrubbing system which yields an exit gas from the sulfuric acid plant containing less than 0.03% sulfur dioxide. The system involves the use of a redwood scrubbing tower and a stripper for recovering sulfur dioxide from the ammonium sulfite-bisulfite solution. Sulfuric acid is added to the stripper to convert the ammonium sulfite-bisulfite solution to ammonium sulfate. The 40% solution of ammonium sulfate from the stripper is pumped to an adjacent fertilizer plant for processing.

1122

- Lawley, L. E. 1954
ACOUSTIC METHODS FOR GAS ANALYSIS. *Chem. and Indus.*, no. 8, Feb. 20, 1954: 200-202, illus.
DLC (TP1.S6332, no. 8)

Limitations and advantages of acoustic methods that measure, directly or indirectly, the velocity of sound in a gas are discussed in relation to their application to gas analysis. The principles of the phase shift method are considered and an acoustic phase shift gas analyzer -- designed for use in a mixture of air and methane -- is discussed and illustrated. The apparatus is in 3 parts, indicator unit, acoustic tube, and power unit. A model of the apparatus has been operating satisfactorily under industrial conditions, 24 hr a day for several months. Its adaptation to provide immediate and automatic warning of small changes in a gas mixture is suggested.

1123

- Lawther, P. J. 1955
EFFECTS OF INHALATION OF SULPHUR DIOXIDE ON RESPIRATION AND PULSE RATE IN NORMAL SUBJECTS. *Lancet*, v. 269, Oct. 8, 1955: 745-748.
DNLM

The effect of sulfur dioxide on breathing was studied in connection with the problem of air pollution in London fog. Eighteen healthy adult males aged 21-40 yr were

used as subjects. The experiments were parallel to those of Amdur, Melvin, and Drinker (The Lancet, 1953: 758), whose test subjects in Boston, Mass. evidenced consistent changes in respiration and pulse rates with low concentrations (1-8 ppm) of sulfur dioxide. With 2 exceptions in the present study, no consistent changes in tidal volume, respiratory rate, or pulse rate followed inhalation for 10 min. of air containing 5, 10, or in a few cases 20 ppm of sulfur dioxide by either the subjects living in London or a smaller group living in an adjacent rural area. Inhalation was by use of a mouth piece; there were no changes when a face mask was used. Two apparently healthy individuals developed bronchospasms when they inhaled air with a concentration of 10 ppm. None of the other subjects developed clinical signs of bronchospasm, nor were any distressed by the gas. Most subjects detected the gas, some coughed or reported irritation with the higher concentrations, and a few signalled that they detected the gas when none was present.

1124

- Leake, J. W. 1957
LOUISVILLE INCINERATOR OPERATES ON PRODUCTION LINE BASIS. Amer. City, v. 72, Nov. 1957: 104-107. DLC (HT101.A5, v. 72)

Louisville, Ky. has completed a new incinerator having 3 units, each rated at 250 tons/24 hr. The installation, operated on a production-line basis, is capable of salvaging metal, and burning such wastes as tree trunks. Each combustion chamber is 14 ft by 18 ft by 22 ft. The spray collectors for each unit occupy a chamber 50 ft by 8 ft by 14 ft. Two water spray cooled baffles, constructed of vertical metal slabs, permit some gas to pass through to change the direction and velocity of flow causing the fly ash to drop onto the chamber floor. The plant is equipped with sludge-drying facilities. A diagram of the installation is included.

1125

- Leary, D., H. C. Hodge, and R. P. Schwartz. 1956
IS POLLEN A CONTRIBUTING FACTOR IN THE SEASONAL INCIDENCE OF POLIOMYELITIS? Ann. Allergy, v. 14, Mar.-Apr., 1956: 157-161. DNLM

Incidence of poliomyelitis has been shown to parallel and show peaks similar to the peaks of highest air pollution with grass and weed pollens. Patients who have had poliomyelitis have been found to react positively to skin testing with pollen about twice as often as might be expected in a random sampling. These factors suggest a possible relationship between poliomyelitis and pollinosis which may, however, be entirely coincidental.

1126

- Leavitt, J. M., F. Pooler, Jr., and R. C. Wanta. 1957
DESIGN AND INTERIM METEOROLOGICAL EVALUA-

TION OF A COMMUNITY NETWORK FOR METEOROLOGICAL AND AIR QUALITY MEASUREMENTS. (Paper presented at the Golden Jubilee Meeting of the Air Pollution Control Association, St. Louis, Mo., June 4, 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 22 p., illus. DLC-Sci

Also published in: Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 211-215.

The air quality and meteorological measuring network designed and installed for an air pollution study of Louisville, Kentucky, is described. Preliminary results indicate that the network data qualitatively describe the airflow and air quality patterns. All of the air sampling stations were located at one or the other of two previously selected distances from the main source area. The network was designed to operate on a continuous schedule with the measurement of at least one common pollutant being made at all air sampling stations.

1127

- Lee, G. W., and J. P. Graham. 1957
MITIGATION OF SMOKE, DUST AND GRIT AT COKE-OVEN PLANTS. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 129. DLC (TD884.S855, v. 28)

This paper outlines the present scale of carbonization and its connection with the iron and steel industry and the domestic market. Coke-oven plants are affected by the alkali, etc., Works Regulation Act of 1906 and the Clean Air Act of 1956. Fundamentally, new processes are unlikely to be developed in the foreseeable future, so the immediate problem is the mitigation of pollution by existing coke-oven plants. The sources of atmospheric pollution at coking plants are described in detail, and recommendations are made for reducing them. (Quoted in full)

1128

- Lense, F. T. 1954
BW EVALUATION OF PRESSURIZED BUILDING. Army Chemical Corps, Fort Detrick, Md. Special Report No. 171, 10 May 1954, 49 pages, illus. DLC-Sci

Two series of tests were carried out in September and October 1952 to study the effectiveness against bacterial contamination (*B. subtilis* var. *niger*) of a pressurized protective shelter and of a temporary protective shelter. The tests showed that no major differences in protection were given by pressures in a building of 0.6, 0.4, 0.2, and 0.01 in. of water. Respiratory exposure dosages in the order of 2.0×10^6 organisms were prevalent outside the building for the three hours of the test periods. However, the respiratory exposure inside the building in all cases for the same period of time or longer was not significantly higher than the background counts. These tests also showed the advantage of the E35 collective protector to

that of a filter wall installation. To decontaminate the building, formalin was applied by means of a smoke generator, and was 99.99 percent effective in killing *B. subtilis* var. *niger* spores; however the building was unusable for at least two weeks, even when 5,000 cfm of air was continuously applied to the building. Effective decontamination of external building surfaces and adjacent terrain was obtained with 4 percent slurry of hypochlorite and Naccanol applied from an M3A2 decontamination truck.

1129

- 1953
LESS SMOKE AT MONESSEN. Steel, v. 133, Dec. 7,
1953: 115. DLC (TS300.1745, v. 133)

The Pittsburgh Steel Co. at Monessen, Pa., has reduced by 23% the amount of solid materials escaping with the exhaust fumes, by employing an electrostatic process. New slag handling methods prevent the release of fumes or odors during granulating processes. It is planned to install a new turboblower in 1954 which will contribute to cleaner air by maintaining a constant blast in the furnaces. Blast furnace smoke is now diverted to a mixing station for subsequent use in heating operations. These improvements also provide substantial savings.

1130

- Lewis, J. V., 1956
and N. L. Nussbaumer.
ROCHESTER, N. Y. DOCUMENTS DESIGN, CON-
STRUCTION, AND OPERATING COSTS OF ITS TWO
NEW INCINERATORS. Amer. City, v. 71, Sept. 1956:
105-108, illus. DLC (HT101.A5, v. 71)

In designing and building Rochester, New York's 2 new plants for garbage and refuse incineration, air-pollution control equipment conforming with the rather rigid ordinances already enacted was incorporated. Fly ash control equipment in the West Side plant, costing about \$59,400, consists of a stationary refractory baffle, stainless-steel link screen, nozzle sprays for washing the gases with a water pond below to collect slurry, a stainless-steel scrubber baffle that can be set for varying openings, and 2 induced draft fans to take the gases around the baffle. The installation also includes the necessary water supply and drain to the sewer. Test data on the operation of the incinerator showed that the requirements of the ordinance could not be met without using the control equipment. Also using the data, it was found that costs could be cut somewhat by eliminating the induced draft fans. When the East Side installation was built, 2 new improvements were included. A Spencer Turbine Co. dust-removal system was installed for picking up the fly ash from the combustion chamber and breaching periodically, as well as for general cleaning purposes. On an experimental basis, a hydraulically operated dumping-grate mechanism is in successful operation. Besides being more economical in operation than the older plant, there is less dust and nuisance along the collection routes because of the use of enclosed collection units, and a general improvement of working conditions exists within the plant.

1131

- Linsky, B. 1957
AUTOMOTIVE VEHICLE FUMES. (Paper presented
at the 49th Annual Meeting of the Air Pollution Control
Association, Buffalo, N. Y., May 20-24, 1956). Publ.
Health Rep., v. 72, Jan. 1957: 70-72.
DLC (RA11.B17, v. 72)

When the existing procedures for vehicular exhaust control in Detroit, Mich. were no longer adequate, the Detroit Smoke Abatement Bureau decided that existing legislation should be modified. It was decided that the motor vehicle code, modified, should be the basis for effective legal control, with the police, rather than the authorized civilian representatives previously employed, being responsible for surveillance, patrolling, and field enforcement. As the result of the interest taken in the pending legislation by engine makers, bus and truck makers, etc., many realistic suggestions were made. In addition, several voluntary changes in operating procedure were instituted by some of the interested groups. The Automobile Manufacturers Association (AMA) worked with the Bureau, and acted as a coordinating agency. After further study, the vehicular exhaust control ordinance was rewritten by engineers and legal specialists of the AMA and the city of Detroit, becoming effective in Apr. 1956.

1132

- Littman, F. E., 1956
H. W. Ford, and N. Endow.
FORMATION OF OZONE IN THE LOS ANGELES
ATMOSPHERE. Indus. and Eng. Chem., v. 48, Sept.
1956 (Pt. 1): 1492-1497, illus.
DLC (TP1.I6, v. 48)

The reactions leading to the formation of oxidants in the Los Angeles atmosphere are described. Ozone is formed by nitrogen dioxide photolysis aided by rapid conversion of nitric oxide to nitrogen dioxide in the presence of certain hydrocarbons. The characteristic diurnal changes in concentration parallel the amount of available sunlight, suggesting that the oxidant is produced by the action of light. An oxidant can be formed by irradiation of night air with artificial light.

1133

- Logan, W. P. D. 1953
MORTALITY IN THE LONDON FOG INCIDENT, 1952.
Lancet, v. 264, Feb. 14, 1953: 336-338, illus.
DLC (R31.L3, v. 264)

Figures from the Registrar-General's weekly returns, and additional data, indicate that the 4,000 deaths in the London fog of Dec. 1952 make this incident rank as a major catastrophe. For a few days, the death rate attained a level which has been approached or exceeded, during the past 100 yr only by the influenza epidemic of 1918-1919, and the cholera epidemic of 1854. Statistical data are given including when and where these deaths occurred, the age distribution, and the reported medical causes. Weekly reports of deaths are tabulated for

this incident, and for 4 other periods of dense fog in London: Dec. 1873, Jan. 1880, Dec. 1892, and Nov.-Dec. 1948.

1134

Lombardo, J. B. 1953
ANALYSIS OF SULFURIC ACID CONTACT PLANT
EXIT GAS: CRITICAL REVIEW OF ANALYTICAL
METHODS FOR ACID MIST AND SULFUR DIOXIDE.
Anal. Chem., v. 25, Jan. 1953: 154-160, illus.
DLC (TP1.1616, v. 25)

"A practical analytical method for the determination of sulfuric acid mist and sulfur dioxide in sulfuric acid contact plant exit gas was developed after a comprehensive search of the literature disclosed the absence of such a method, which is essential for the proper control of the process and evaluation of air pollution. Its application has contributed materially to the intelligent control of a modern sulfuric acid contact plant."
(Quoted in part)

1135

LOW-PRICED DEODORIZING AGENT. Indus. Wastes, v. 1, Nov.-Dec. 1955: 58A.
DLC

"Fritsche Brothers, Inc., New York, N. Y., has developed a low-priced deodorizing agent for the control of offensive odors arising from city dumps and sewage disposal plants. The new product, identified as Putrol, is recommended especially for masking the odors of putrefaction and for controlling odors resulting from the decomposition of protein materials. It is reported to be very effective in reducing the unpleasant 'byodors' from fat rendering operations. A companion product, Neutroleum, developed by the same chemical firm, has been used for years and is one of the most successful and widely employed deodorants ever developed for general industrial application. It has been used effectively in masking the odors associated with various industrial wastes." (Quoted in full)

1136

Lucas, D. H. 1957
CERTAIN ASPECTS OF THE DEPOSITION OF DUST.
Jour. Inst. Fuel, v. 30, Nov. 1957: 623-627; discussion, v. 31, Jan. 1958: 32-41 (passim).
DLC (TP315.16, v. 30)

The theory and procedure of the measurement of dust deposition are discussed. Experiments show that a deposit gauge at ground levels collects far more dust than a gauge 4 ft above ground level. Much of the additional catch is dust re-entrained from the ground and is therefore spurious deposition. The amount of dust found at a particular place depends not only on the deposition rate at that place but also on its power to retain dust when the wind velocity rises above 20 ft/sec. In the survey discussed, approximately 1/4 of the dust collected in deposit gauges came from the power station,

which was the source of dust being measured. Results indicate that only a small proportion of the dust emitted from the station falls within a two mile radius. --- In the discussion of the paper, it is suggested that the diffusion coefficient was approximately correct for the calculations; however, consideration should be given to the fact that results were not actually calculated for an infinite plane.

1137

Ludwig, H. F., 1956
and F. A. Butrico.
GRADUATE STUDY IN COMMUNITY AIR POLLUTION
CONTROL. (Paper presented at the Ninth Municipal
and Sanitary Engineering Conference, Gainesville, Fla.,
Apr., 1956). Public Health Service (U.S.). Office of
Engineering Resources, Washington, D. C. [1956].
6 p. DLC-Sci
Also published in Univ. of Florida. Florida Engi-
neering and Industrial Experiment Station, Gainesville.
"Atmospheric Pollution" ... Bulletin Series no. 83 ...
Sept. 1956, p. 53-55. DLC-Sci

The proposed curricula for a one-year graduate program of studies in air pollution engineering and the prerequisite technical background are outlined.

1138

Lunche, R. G., 1957
A. Stein, C. J. Seymour, and R. L. Welmer.
DISTRIBUTION SURVEY OF PRODUCTS EMITTING
ORGANIC VAPOURS. Chem. Eng. Progr., v. 53, Aug.
1957: 371-376, illus.
DLC (TP1.A6, v. 53)

Organic solvent usage in the Los Angeles Area is approximately 500 tons per day. Results of surveys are given listing the sources of about 400 tons of organic solvents vaporized into the atmosphere daily. A tabulation of survey data is given with respect to the variety and volume of solvents consumed by dry cleaners, rotogravure plants, manufacturers of paint, varnish, enamel, and lacquer, and surface coating users, e.g., automobile assembly plants, furniture manufacturers, etc. Major sources of organic solvent emissions in Los Angeles County, classified by type of operation, are establishments engaged in drying of surface coatings, degreasing or metal cleaning, and dry cleaning of clothes.

1139

Lunde, K. E. 1956
INVESTIGATION OF AIR POLLUTION IN THE VICINI-
TY OF PORTLAND, OREGON. Stanford Research
Inst., Stanford Univ., Calif. Final Report, Oct. 4,
1956. 102 p., illus. (S.R.I. Project no. S-1674).
DLC (TD883.S8)

Ore. area contribute approximately 75% of the compounds (hydrocarbons, and oxides of nitrogen) which are thought to cause smog; industry contributes the re-

maining 25%. Industry, on the other hand, contributes by far the greatest proportion of dusts and other solid matter which fall out, or deposit, on horizontal surfaces. Data are plotted on graphs showing the potential emissions of certain components, e.g., sulfur dioxide, aldehydes, solids, hydrogen sulfide, ammonia, acids as acetic acid, etc., in tons/day in this area. Industry is also the largest contributor of the fine particulate matter which reduces visibility. There may, however, be a further reduction in visibility owing to the discharge of smog-forming materials primarily contributed by the general public. Whether this latter contribution is more or less important than that of the known materials in reducing visibility is still uncertain. Under equally adverse meteorological conditions, it is estimated that the concentration of materials which contributes to smog in Portland are approximately 1/4 to 1/6 of that in Los Angeles, Calif. The frequency of meteorological conditions which leads to the accumulation of air pollutants is, however, probably 40% less than that in Los Angeles. These conditions occur, for the most part, during the early fall. On the basis of expected population and industrial growth, with no further control measures than exist at present, concentrations of smog-forming and other pollutants in the Portland atmosphere will probably increase by about 50% by 1965. Even this increase would not result in as high concentrations of smog-forming material as occur presently in Los Angeles. It would, however, bring Portland to the threshold of probable smog as estimated by Went ("Global Aspects of Air Pollution as Checked by Damage to Vegetation"). Proceedings of the 3rd National Air Pollution Symposium, Pasadena, Calif., Apr. 18-20, 1955) on the basis of total organic emissions/unit area. Appendixes present information on: (a) emissions from waste incineration; (b) exhaust emissions from fuel consumption; (c) emissions from industrial sources; (d) miscellaneous emissions from a summary of exhaust emissions in the Portland area; and (e) meteorological studies of the Portland area. (Contractor's abstract in part)

1140

Lunde, K. E., 1957
and C. E. Lapple.

DUST AND MIST COLLECTION. Chem. Eng. Progr., v. 53, Aug. 1957: 385-391. DLC (TPI.A6, v. 53)

The basic techniques of dust and mist collection involve phases of deposition of the particles on a collecting surface, retention of the deposit on the surface, and removal of the deposit for measurement. A summary of mechanisms and parameters in aerosol deposition is given. Deposition efficiency attained in any application may be modified by sonic flocculation by condensing moisture on suspended particles, or, in the case of mists, by coalescing mist particles into large droplets by high-velocity packing. To obtain an estimate of the effect of particle size on equipment performance, a fractional efficiency curve will give a relative measure of the influence of size. Calculations are usually made by comparing size analysis data of materials fed to the collection equipment with those of materials escaping collection.

1141

Luscher, E. 1953
MEASUREMENTS OF THE SPEED OF LITTLE PARTICLES IN AIR CURRENT. Brit. Jour. Appl. Phys., v. 4, Sept. 1953: 284-285. DLC (QC1.I548, v. 4)

An apparatus is described and illustrated by which it is possible to measure the speed of particles in the air directly. At one point in the system the particles are charged so that their "run-time" in the air current can be measured between 2 electrodes. To obtain exact results, only the Y-deflection of the oscilloscope is used, the deflection photographed by a camera having a very constant film speed. Completely dust-free air is used in order to ensure that particle speed is measured and not the speed of ionized air molecules.

1142

McCabe, L. C., 1952
and G. D. Clayton.
AIR POLLUTION BY HYDROGEN SULFIDE IN POZA RICA, MEXICO. Arch. Indus. Hyg. and Occupat. Med., v. 6, Sept. 1952: 199-213, illus. DLC (RC963.A14, v. 6)

A review is presented of the air-pollution incident at Poza Rica, Mexico, on Nov. 24, 1950 in which 320 persons were hospitalized and 22 died. The onset, symptoms, and pathological findings described were consistent with hydrogen-sulfide poisoning. It was concluded that the polluting hydrogen sulfide was contained in the effluents from a sulfur-removal installation.

1143

McCabe, L. C., 1952
AIR POLLUTION: PROCEEDINGS OF THE UNITED STATES TECHNICAL CONFERENCE ON AIR POLLUTION, [WASHINGTON, D. C., MAY 3-5, 1950]. (Sponsored by the Interdepartmental Committee on Air Pollution). New York, McGraw-Hill Book Company, Inc., 1952. 847 p. DLC (TD887.U5, 1950)

With the objective of bringing together and making available the information which had come out of research and development programs sponsored by the civil and military agencies of the Federal Government, the Director of the Bureau of Mines, in July 1949, recommended that the Secretary of the Department of the Interior initiate informal interdepartmental discussions on atmospheric pollution. After four informal meetings, attended by representatives of several Government agencies, it was proposed that an Interdepartmental Conference on Atmospheric Pollution be called. In response to a request, in December 1949, by President Truman to the Secretary of the Interior, the Conference convened in Washington, D. C., on May 3-5, 1950. In addition to Government representatives, outstanding air pollution experts from universities, research foundations, and industry, were invited to attend. The Conference was divided into the following seven panels: Agriculture, Analytical Methods and Properties,

Equipment, Health, Instrumentation, Legislation, and Meteorology. The various panels convened separately during the first two days and then in a common session on the third day, to report and discuss findings. This book includes the papers presented in the various panels, the discussions on these papers, and the reports given at the general sessions.

1144

- McCabe, L. C. 1952
INTERRELATIONSHIP OF AIR POLLUTION AND WATER POLLUTION. (Paper presented at the 24th Annual Meeting, Federation of Sewage and Industrial Wastes Associations, St. Paul, Minnesota, Oct. 8-11, 1951). Sewage and Indus. Wastes, v. 24, Jan. 1952: 83-86. DLC (TD511.S4, v. 24)

Air pollution and water pollution are closely related since they often arise from the same causes and affect the same areas. In many instances, the materials discharged to the air are the same that contaminate the water. Occasionally, water pollution has been eliminated by discharging the pollutants into the air. In the mineral industries, this interrelationship has presented some particularly disturbing dilemmas in view of the fact that the industrial economy of the United States has increased in size more than twice since World War II. Authoritative estimates indicate that wastes from industrial processes are greater factors in pollution than are domestic sewage wastes and that the mineral industries are contributing a goodly portion of those industrial wastes. Waste discharges into the air may be made up of smoke, cinders, fly ash, chemical and metallurgical dusts, and various fumes and odors. The dollar value of damage done by contaminants and the amount of money spent to keep contaminants from being discharged into the air, are both very large sums. However, in the latter category, there are examples of dust and fume recovery that promise to extend the life of the country's mineral resources. For instance, large tonnages of sulfur are discharged into the air in stack effluents. Some of this sulfur is being recovered, and the rate of recovery may be increased to the point of making it economically feasible. The greater portion of gasoline losses between the refineries and the ultimate consumer, is to be charged to evaporation; new types of storage tanks may cut such losses appreciably in the future. Large amounts of germanium, gallium, rhenium, selenium, etc., are now going to waste; how much of these metals could be recovered from flue dust and smelter discharges has not been determined. --- Since water pollution is a considerably older field of endeavor, it is suggested that air pollution training, research, and control methods be based on methods applied to stream pollution. Control of industrial contaminants should, in the future, involve simultaneously both air and water pollution control to insure comprehensive and satisfactory elimination of contaminants.

1145

- McCabe, L. C., and L. F. Warrick. 1955
INDUSTRIAL WASTE DISPOSAL: THE PROBLEM AND ITS CONTROL. (Paper presented at the 43rd National

Safety Congress, Chicago, Ill., Oct., 1955). Public Health Service (U.S.). Div. of Sanitary Engineering Services, Washington, D. C. [1955]. 22 p.

DLC-Sci

Types, causes, and sources of air and water pollution are discussed. The technical procedures employed in controlling wastes are indicated. Laws establishing air and water improvement programs are reviewed. The major phases of air pollution study are outlined, and research agencies in the abatement program are listed.

1146

- McCabe, L. C. 1956
HISTORY OF THE AIR POLLUTION PROBLEM. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 10-16. 1956. DPH

Bituminous coal was introduced as a fuel in England in the thirteenth century, and in 1303 a decree was passed forbidding its use. An English commission to study problems and prevention of smoke was formed in 1881. Both a German and a French commission were set up in 1894. The Smoke Abatement Society of Leeds was formed in 1890. Private litigation in the United States involving smoke occurred for the first time in St. Louis in 1864; the first ordinance giving local authority to regulate smoke was adopted in Chicago in April 1881. A smoke ordinance was adopted by Cincinnati in November 1881 and by St. Louis in 1893. By 1912, 23 of the 28 cities with more than 200,000 population had smoke abatement programs. "Smoke" in these early days was a term used to include practically all air contaminants. Later "smoke" and "dust" were defined more specifically, and the Ringelmann chart and other methods, such as the Umbrascope and the Smoke Scope, were developed and used to evaluate smoke density. With St. Louis (1940), Pittsburgh and Allegheny County (1941 and 1949), in the fore, ordinances were passed setting a limit on the percentage of volatile matter in coal used under different conditions and requiring the washing of coal with a high sulfur content. Under these conditions the sulfur dioxide content of the surrounding air was materially reduced. Later, experiments with increased stack heights or washings of flue gases have helped reduce sulfur dioxide emission. In 1950, Haagen-Smit discovered that typical smog damage resulted from the reaction products of ozone with unsaturated hydrocarbons; the maximum damage was found to occur with olefins of a chain length of 5 or 6 carbon atoms with the double bond in the end position. It was also concluded that the series of peroxides formed by the addition of ozone to the double bond were the active agents causing the typical smog damage. Both oil fractions exposed to the action of sunlight and oxygen, and oxides of nitrogen together with olefins, yield peroxides and produce smog damage, which, in turn, causes eye irritation and, at higher concentrations, plant injuries. Emphasis is placed on the need to control losses of hydrocarbons to the air due to operation of refineries, storage and transportation of liquid fuels, and loss of gasoline from automobile exhausts. Research is being carried out on incinerator

designs as a means of controlling air pollution from combustion of rubbish. Considerable work is being done on the health aspects of long-time exposure to smaller amounts of contaminants.

1147

- McCabe, L. C. 1956
PROBLEMS ARISING FROM AIR POLLUTION. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ... Sept. 1956, p. 5-7. DLC-Sci

In this review, examples are presented indicating the extent of present knowledge and attempts at exact definition of air pollution. Several definitions of air pollution may be established for application to specific air contaminants when better instrumentation and measurement techniques are available. It is pointed out that the advantage of natural atmospheric diffusion to disperse gases and aerosols lies in the fact that there is no problem of disposing of economically worthless substances. The importance of micrometeorological data in determining the location of an industrial plant or in zoning a city is also stressed. Indicator plants and vegetation damage caused by air pollutants are considered briefly, as is the problem of synergism. Instrumentation for collection, recordation, and analysis of air pollutants is also discussed. Some of the areas in the field of air pollution needing more research emphasis are mentioned, and the following 3 unsolved problems are listed: (1) a smokeless, odorless domestic incinerator; (2) an automobile exhaust muffler for use with leaded-fuel, 30,000-mi operating range, and a price of less than \$50; and (3) an economically feasible recovery process for sulfur dioxide (concentration less than 0.5% by volume) in stack gases.

1148

- McCaldin, R. O., 1957
P. A. Keeline, and D. C. Wiggins.
AIR POLLUTION IN CONNECTICUT: REPORT OF A COOPERATIVE SURVEY BY THE U.S. PUBLIC HEALTH SERVICE AND THE CONNECTICUT STATE DEPARTMENT OF HEALTH, APRIL-SEPTEMBER, 1956. Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. 1957. 111 p., illus. DLC-Sci

An appraisal of air pollution problems in Connecticut is made by analysis of available data and a study of 169 cities and towns in the state. Air pollution problems are described with respect to population, topography, climatology, industry, transportation, refuse disposal, practices, fuel usage, and use of radioactive material. Air pollution factors are discussed for the 25 largest cities and towns, and their pollution potential is estimated. State and local laws are analyzed, a summary of local air pollution studies is given, and the State Department of Health records of air pollution investigations are examined. Forty-five cities with 68.5% of the state's population reported air pollution sufficient to cause discomfort or inconvenience to residents. Almost half the areas studied reported an air pollution problem due to a burning refuse dump.

1149

- McCarthy, R., 1952
and C. E. Moore.
DETERMINATION OF FREE CARBON IN ATMOSPHERIC DUST. *Analyt. Chem.*, v. 24, Feb. 1952: 411-412. DLC (TP1.B615, v. 24)

By this method for determination of free carbon in atmospheric dust, the sample is treated with 70% nitric acid and heated to destroy the organic matter. The residue which contains the free carbon and insoluble inorganic matter is collected in a porcelain filter crucible, dried, and weighed. Free carbon is then determined by the loss of weight of the crucible on ignition. The validity of the method was tested on samples of standard carbon black, and on a synthetic dust mixture made up of wood flour (organic material), silica (inorganic material), and carbon black (free carbon). Under conditions where high concentrations of clay are probable, the method should be used with caution, as the water lost during ignition would lead to high results. Also samples containing a high proportion of organic matter may need longer periods of digestion. The % of free carbon in samples collected over some American cities is given in a short table. (Authors' abstract in part)

1150

- McCauley, R. F. 1957
THE PRESENT STATE OF COMPOSTING AND ITS AIR-POLLUTION ASPECTS. *Jour. Air Pollut. Control Assoc.*, v. 6, Feb. 1957: 233-237, illus. DLC (TD883.A48, v. 6)

Composting is now suggested as a means of waste disposal for large-scale operations in areas where odors will not create a public nuisance. As yet the process has not been developed to a state where it can be used in urban areas. A discussion of composting and its problems is presented.

1151

- [McCros, W. C.] 1952
ABATING AIR POLLUTION... WITH ELECTRON MICROSCOPES. *Chem. Eng.*, v. 58, Nov. 1952: 327. DLC (TK1.M43, v. 58)

Because of its ability to magnify a specimen up to 50,000 times its actual size, the electron microscope is being used to aid in the identification of material in air pollution, according to W. C. McCros of the Armour Research Foundation. It has also been possible to identify extremely small bits of fibrous materials such as paper, cloth, or feathers.

1152

- McCros, W. C. 1952
DIRT FILLED CITY AND SWIFT SICKNESS: A GREAT DEAL CAN BE DONE ABOUT IT. *Air Repair*, v. 2, Nov. 1952: 10-14, illus. DLC (TUMH.A62, v. 2)

A large program to decrease air pollution in Chicago was initiated by the Midwestern Air Pollution Prevention Association, comprising three parts: (1) a statistical survey of factors contributing to smoke violations, (2) determination of the sources of air pollution, and (3) education of the public. The sources of pollution are combustion products, or dust and dirt. Smoke is due to: use of the wrong fuel, inadequate equipment, or bad firing habits. One of the keys to smoke prevention is complete combustion, i.e., plenty of air at a high temperature, and an adequate mixture of air and fuel gases. One of the most effective means of achieving these results is the use of over-fire jets. There is for every boiler an optimum amount of secondary air; too little air will give unburned smoke, and too much air will cool the gases too rapidly below the burning temperature. This will increase the gas escape velocity through the flues, boiler, and breeching box, and carry heavy smoke up and out of the stack. The use of forced air must, therefore, be carefully controlled. Another aid in preventing smoke is to keep the damper into the breeching box open enough to prevent blow-back into the boiler room. Stack spray will prevent smoke during flue-blowing or fire cleaning operations by preventing the pickup of settled smoke into the stack during periods of high velocity.

1153

- MacCully, C. R., and others. 1956
SCAVENGING ACTION OF RAIN ON AIR-BORNE PARTICULATE MATTER. *Indus. and Eng. Chem.*, v. 48, Sept. 1956 (Pt. 1): 1512-1516, illus.
DLC (TP1.16, v. 48)

The fundamental mechanisms by which rain scavenges air-borne particles have been studied in the laboratory and in the field. The Langmuir accretion theory, originally applied to rain formation, was found useful; however, modifications are required to account for turbulence and sticking probability. Washout data show rain to be an important factor in the scavenging of air-borne particles. The particles investigated ranged from 0.5 to 50 microns in diameter. (Authors' abstract)

1154

- McEwen, L. H. 1952
EFFECTIVENESS OF OPACITY READINGS IN ENFORCING CONTROL OF VISIBLE EMISSIONS. *Air Repair*, v. 2, Nov. 1952: 40-41. DLC (TD483.A48, v. 2)

The courts and smoke abatement enforcement officials accept the Ringelmann Chart as a means for measuring black smoke, but there is no specific method of measuring other visible emissions regardless of color. It is indicated that a photoelectric cell will give the same readings for a 60% obscuring white, gray or brown emission as it does for a smoke reading of no. 3 Ringelmann Chart. Thus, by relating the % of opacity of all colors of emissions with the visibility-obscuring value of a Ringelmann black smoke, an applicable equivalent can be obtained. The validity of opacity

readings taken by trained personnel has been upheld legally.

1155

- MacIntire, W. H., L. J. Hardin, and W. Hester. 1952
MEASUREMENT OF ATMOSPHERIC FLUORINE. *Indus. and Eng. Chem.*, v. 44, June 1952: 1365-1370.
DLC (TP1.16, v. 44)

The average monthly concentrations of fluorine in rain water as measured in various county stations in Tennessee are tabulated for 3 consecutive yr. Similar data from the analyses of Spanish moss exposed to fluorine for 3 months are given. These results indicate 2 feasible and economical methods for locating and determining fluorine pollution in the air.

1156

- MacKenzie, V. G. 1956
STATE-FEDERAL RELATIONS. In *Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems...* Sept. 20-21, 1955. p. 107-110. 1956. DPH

In Public Law 159, passed by the 84th Congress last July, the following policies are set forth: "(1) To preserve and protect the primary responsibilities of the States and local governments in controlling air pollution, and (2) To provide Federal technical services and support and aid for technical research to devise and develop methods of abating air pollution." This policy declaration is consistent with the traditional legal relationship between the U. S. Public Health Service and the States. The general police power remains with the States or the local governments, to whom some of the powers may be delegated. The States also provide regulations for the protection of public health and for the abatement of nuisances. Since Federal-State relationships have in the past proven effective in the health field, they would appear to be sound and should be encouraged in the field of air pollution. Technical assistance available through the Sanitary Engineering Center and grants-in-aid for support of training, and demonstration projects, are discussed. The paper concludes with the announcement that a "Federal Interdepartmental Advisory Committee on Community Air Pollution is being established under the Chairmanship of the Department of Health, Education, and Welfare. The Committee will have members from the Department of Agriculture, the Department of Commerce, the Department of Interior, the Department of Defense, the Atomic Energy Commission, and the National Science Foundation." The Committee is expected to draw on all available sources of technical competence and facilities in the Federal government.

- 1157 MacKenzie, V. G. 1957
AIR POLLUTION--A PROGRESS REPORT. (Presented at the Meeting of the Association of State and Territorial Health Officers, Nov. 7, 1957). Public Health Service (U.S.). Div. of Sanitary Engineering Services, Washington, D. C., [1957]. 9 p. DLC-Sci
See Air Pollution Bibliography, v. 2, Abstract no. 1159.
- 1158 MacKenzie, V. G. 1957
THE AIR POLLUTION PROGRAM OF THE PUBLIC HEALTH SERVICE. Military Med., v. 121, Aug. 1957: 79-83. DLC (RD1.A7, v. 121)
See Air Pollution Bibliography, v. 2, Abstract no. 1159.
- 1159 MacKenzie, V. G. 1957
THE PUBLIC HEALTH SERVICE AIR POLLUTION PROGRAM: A PROGRESS REPORT, 1957. (Paper presented at the Third Southern California Conference on Elimination of Air Pollution, Los Angeles, Calif., Nov. 21, 1957). Public Health Service (U.S.). Division of Sanitary Engineering Services, Washington, D. C. [1957]. 25 p. DLC-Sci
An outline is presented of the progress of the Public Health Service Air Pollution Program of research and technical assistance established as a result of Public Law 159, U.S. 84th Congress. Current research studies pertain to the physical sciences, engineering control aspects, and effects on human health. A summary list of research projects for the 1958 fiscal year, of recipients, titles of projects, and of community air pollution program research grants awarded as of Oct. 1, 1957, is enclosed.
- 1160 MacKenzie, V. G. 1958
PROGRESS REPORT ON AIR POLLUTION. Publ. Health Rep., v. 73, Jan. 1958: 39-41. DLC (RA11.B17, v. 73)
A summary of the progress of the air pollution abatement program in the United States is given. Factors contributing to the pollution problem are discussed, such as changes in fuel usage, increased per capita use of energy, and increased per capita consumption of materials. Existing local and state ordinances are reviewed. Air pollution studies and the air pollution program of the U. S. Public Health Service are outlined.
- 1161 McLafferty, F. W., G. E. Clock, and R. S. Gohlke. 1953
IDENTIFICATION AND DETERMINATION OF VOLATILE ATMOSPHERIC POLLUTANTS. (Paper presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, Pa., Mar. 2-6, 1953). [Abstract]. Analyt. Chem., v. 25, Mar. 1953: 526. DLC (TP1.I615, v. 25)
A rapid and sensitive method for the detection and determination of volatile pollutants in the atmosphere is described. This method has the advantages of small sample requirements, fewer mass spectrometer analyses, sensitivity, and speed; this makes it particularly suitable for the routine survey of industrial plant areas for possible atmospheric hazards. The foreign vapors are condensed from the air at about -175°C in a trap placed in a metal liner cooled in liquid nitrogen. Vapor, oil, and water phases are separated from the condensate, their amounts determined, and portions of them are analyzed on the mass spectrometer. Recoveries of around 95% were found on most control mixtures. Results from several plant problems show the usefulness of the method in identifying and determining many unsuspected atmospheric pollutants.
- 1162 McNulty, I. B., and D. W. Newman. 1957
EFFECTS OF ATMOSPHERIC FLUORIDE ON THE RESPIRATION RATE OF BUSH BEAN AND GLADIOLUS LEAVES. Plant Physiol., v. 32, Mar. 1957: 121-123. DA (450.P692, v. 32)
Plants exposed to excess fluorides exhibit a characteristic scorch of the leaf tip or margin. Bush bean and gladiolus plants were exposed to known concentrations of atmospheric fluoride and the respiration rate of their leaves was measured manometrically. The fumigation resulted in an increase in leaf respiration of bush plants after a minimum of 8 days at an atmospheric fluoride concentration of 30 parts per billion. Middle-age and old leaves showed a greater increase in respiration than young leaves. Gladiolus leaves fumigated at 2.24 plants per billion for 25 days showed a high degree of stimulation of respiration of the chlorotic tissue next to the scorched area, and a lower but significant stimulation of tissue respiration 5 cm from the dead area. Liming the leaves of gladiolus plants protected them against fluoride damage while not affecting their respiration rate.
- 1163 McRae, A. D. 1957
AIR POLLUTION CONTROL IN PETROLEUM REFINING. Chem. in Canada, v. 5, Oct. 1957: 40-43. DLC (TP1.C815, v. 5)
Methods of reduction of smoke and particulate matter used in the petroleum industry are described. The abatement process used for each of the following

pollutants is discussed: hydrogen sulfide, carbon dioxide, sulfur dioxide, sulfur trioxide, hydrogen fluoride, phenolic compounds, naphthenic acids, aldehydes, smoke, mists, fumes, dusts, and ashes. Steps taken by the industry to reduce hydrocarbon losses during process operations and storage are reviewed.

1164

McWilliams, S., and W. A. Morgan. 1955

THE RELATION BETWEEN THE CONCENTRATION OF ATMOSPHERIC CONDENSATION NUCLEI AND OTHER METEOROLOGICAL ELEMENTS AT VALENTIA OBSERVATORY. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 129-146, illus. DGS

Measurements of the concentration of condensation nuclei, made twice daily (00 h and 12 h GMT) with a Nolan-Polak photoelectric counter at Valentia Observatory (southwest Ireland) during 1951-1954, are analysed to show their relationship with other meteorological elements. It was found that nuclei concentration at 12 h is generally higher than at 00 h, and precipitation at the time of observation or in the preceding hr reduces concentration by between 40% and 50%. From measurements made when there was no precipitation, it was revealed that concentration decreases with increasing wind speed but does not vary appreciably with wind direction apart from a sector from which pollution could be expected. High concentrations were found with visibility below 7 miles, with inversion of temperature, and, at 12h, with low cloud coverage. The annual variation of concentration of nuclei, when free from the effects of pollution, followed fairly closely that of the duration of bright sunshine. (Authors' abstract in part)

1165

Mader, P. P., and others. 1952

DETERMINATION OF SMALL AMOUNTS OF HYDROCARBONS IN THE ATMOSPHERE. *Analyt. Chem.*, v. 24, Dec. 1952: 1899-1902, illus.

DLC (TP1.1815, v. 24)

A spectrophotometric method for determining small concentrations of hydrocarbons in the atmosphere has been developed. It employs the use of a specially built 100-cm gas cell supplied with rock salt windows and inserted between the light source compartment and receiver compartment of a Beckman infrared spectrophotometer, because of the large volume of the new cell, the entire sample can be swept into the light path of the instrument. The hydrocarbon sample is collected by a freeze-out technique, using a Shepherd sampler immersed in liquid oxygen. Based on the collection of the condensates of a 60-l air sample, the instrument records the presence of 23 micrograms of benzene, or less than 1 ppm of this hydrocarbon. The results obtained for known hydrocarbon concentrations are accurate and consistent. This method was successfully applied to the determination of hydrocarbons from

air streams over polluted areas or inside industrial establishments. (Authors' abstract)

1166

Mader, P. P., M. W. Heddon, M. G. Eye, and W. J. Hamming. 1956
EFFECTS OF PRESENT-DAY FUELS ON AIR POLLUTION. *Indus. and Eng. Chem.*, v. 48, Sept. 1956 (Pt. 1): 1508-1511. DLC (TP1.18, v. 48)

Test data indicate that internal double-bond olefins, as well as branched-chain a-olefins, are readily oxidized upon irradiation with sunlight in the presence of oxides of nitrogen. Comparisons between thermally and catalytically cracked gasolines indicate that the present-day gasolines showed an increase in internal double-bond olefins and in branch-chain a-olefins. Internal double-bond olefins increased 117.8%, and branched-chain a-olefins increased 73.2%. The change in composition is apparently one of the factors that contributes to smog intensity.

1167

Magee, K. B. 1953
EXHAUST ODOR REMOVED BY CARBON. *Heating and Ventilating*, v. 50, May 1953: 107.
DLC (TH7201.H4, v. 50)

The emission of odorous non-combustible gases and solids resulting from the baking of lacquered wires presented a serious neighborhood nuisance. The problem was not eliminated by complete burning of the effluent gases and solids. The system finally employed with satisfaction consists of impingement dust filters (to remove airborne particles) which lead to a bank of carbon filters. The catalytic burners are used in conjunction with this arrangement, thus prolonging the life of the carbon filters.

1168

Magill, P. L., and E. Robinson. 1952
TRAILS IN THE ATMOSPHERE. *Air Repair*, v. 2, Nov. 1952: 8-9. DLC

Smoke trails in the atmosphere can be interpreted, and applied in the analysis of air pollution problems. The effects of temperature in vertical stratification of the atmosphere are used in discussing a study of an unusual atmospheric situation over Long Beach, Calif. on a day in Jan. 1949. Intense heat caused smoke to penetrate a higher stratification of the atmosphere. The effect of different air streams in mixing and dispersing smoke is illustrated in a photograph of the area taken on this particular day. It is pointed out that both vertical and horizontal air movements are important meteorological phases in the study of air pollution problems.

1169

- Magill, P. L., and C. Ackley. 1956
AIR POLLUTION HANDBOOK. New York, McGraw Hill
 Book Co., Inc., 1956. 652 p. incl. illus.
 DLC (TD883.M35)

Theoretical, technical, and practical aspects of air pollution are discussed. The information is treated in the various sections as follows: (1) Air Pollution Sources and Their Control; (2) City Planning, Industrial-plant Location, and Air Pollution; (3) Chemistry of Contaminated Atmospheres; (4) Physics of the Atmosphere; (5) Evaluation of Weather Effects; (6) Visibility and Air Pollution; (7) Epidemiology of Air Pollution; (8) Effects of Air Pollutants on Farm Animals; (9) Effects of Air Pollution on Plants; (10) Sampling Procedures; (11) Analytical Methods; (12) Experimental Test Methods; (13) Equipment and Process for Abating Air Pollution; and (14) Air Pollution Control by Legislation. Bibliographies follow each section; extensive tables and illustrations are included. Each section will be analyzed separately.

1170

- Mallette, F. S. 1954
A NEW FRONTIER: AIR-POLLUTION CONTROL.
 (James Clayton Paper presented at a General Meeting at the Institution, London, Apr. 23, 1954). Proc. Inst. Mech. Eng., v. 168, 1954: 595-627, illus.
 DLC (TJ1.I5, v. 168)

The control of air pollution is considered including: legislation and local accomplishments; international action; river traffic; model ordinances; meteorology; the Donora, Pa. smog; development of instruments for control; problems of the iron and steel industry; control equipment; and some socio-economic considerations. Among the ordinances discussed are those of St. Louis, Mo.; Allegheny County, Pa.; New York City; California, especially Los Angeles County; and some in Canada. Control equipment in the steel, power, and rubber industries is also discussed.

1171

- Mallette, F. S. 1956
LEGISLATION ON AIR POLLUTION. (Paper presented before the 18th Annual Meeting of the American Power Conference, sponsored by the Illinois Institute of Technology, Chicago, Ill., Mar. 21-23, 1956). Publ. Health Rep., v. 71, Nov. 1956: 1069-1074.
 DLC (RA11.B17, v. 71)

A short history is given of the legislation on air pollution beginning with the mention of a lawsuit in 1864 in St. Louis, Mo. which brought about a judgment declaring smoke to be a nuisance. Before 1940, dense smogs were frequent in the St. Louis area. St. Louis was, probably, the first large city to make an effective reduction in smoke pollution. Essentially, this improvement was achieved through enactment and enforcement of an ordinance prohibiting the sale of high volatile coal

in the city except in sizes under 2 in. It was also required that all bituminous coal containing over 12% ash or 2% sulfur be washed. In Pittsburgh, Pa., a great civic movement, the Allegheny Conference on Community Development, was instrumental in bringing about drastic changes. The ordinances of the city of Pittsburgh and Allegheny County, Pa. have brought about a marked reduction in smoke content of the air, principally by increased inspection and enforcement and by restricting the volatile content of solid fuels. Major national legislation was brought about with the passage by the 84th Congress of Public Law 159 which became effective July 14, 1955. Pertinent sections of this law are presented. (Quoted in part)

1172

- Mallory, E. R. 1957
HOW TO PREVENT STREAM AND AIR POLLUTION: A COMMUNITY RELATIONS PROBLEM. Indus. Wastes, v. 2, Mar.-Apr. 1957: 45-48, illus.
 DLC

The Warner Co. of Bellefonte, Pa., manufacturer of lime and agricultural limestone, has been conscious of its role in community relations in the control of dust and other materials since the opening of the plant in 1921. Although early attempts to control the dusts were unsuccessful, the present system of wet scrubbers has proved to be quite satisfactory. The slurry from the wet dust collecting system is pumped up a hill and into a mine, 1700 ft away. The water which drains off is then pumped back into the collecting system so that it will not pollute nearby streams. Constant reuse of this water makes it very hard causing scale to build up quickly in the pipes. As a result they must be reamed out periodically. Control equipment now in use represents a capital outlay of \$250,000, and an operating expense of approximately \$50,000 yearly.

1173

- 1954
MANCHESTER AND THE BEAVER COMMITTEE. Smokeless Air, v. 24, Summer 1954: 193-194.
 DLC (TD884.S855, v. 24)

A memorandum was drawn up by the Town Clerk and the Medical Officer of Health of Manchester and submitted to the Beaver Committee. The memorandum is said to be based on evidence derived from practical experience, especially in the matter of smokeless zones and prior approval. The first smokeless zone in the center of Manchester, England, is estimated to have stopped over 3 tons of smoke a week from being emitted to the atmosphere. The smokeless zone has been operated successfully for nearly 2 yr. There is now a request on file for extension of the zone. Psychologically the effects have been tremendous in that Manchester has become markedly "smoke conscious," and public opinion is ready for a marked increase in smoke prevention measures. Prior approval of furnaces and boilers has been established on a workable basis. Prior approval powers were brought about by the Manchester Corporation Acts of 1946 and 1948. The memorandum concludes with a 6-point plan for action that is necessary if the Corporation is to secure a

progressive reduction of air pollution in the city in the next few yr.

1174

Marks, J.,

1956

M. A. Mason, and G. Nagelschmidt.
A STUDY OF DUST TOXICITY USING A QUANTITATIVE
TISSUE CULTURE TECHNIQUE. *Brit. Jour. Indus.*
Med., v. 13, July 1956: 187-191.

DLC (RC963.A23, v. 13)

A fairly close agreement was found between the toxicity to leucocytes *in vitro* of a number of dusts of interest in the study of pneumoconiosis and their fibrogenic activity as reported by other workers. Silicates proved to be more toxic in tissue culture, however, than experiments on animals would have suggested. Silica toxicity to leucocytes *in vitro* is antagonized by certain aluminum compounds. Tables are included.

1175

Marks, J. C.

1952

NEW COUNTY CONTROL DISTRICT INAUGURATED:
JEFFERSON COUNTY, SURROUNDING LOUISVILLE,
KY., TO BATTLE AIR POLLUTION. *Air Repair*, v.
2, Aug. 1952: 35-36, illus.

DLC

Jefferson County has established a new mobile laboratory unit, patterned after that used by the State of Pennsylvania Department of Air Pollution Control, equipped with stack sampling, general atmospheric sampling devices, and some meteorological recording equipment. The N. A. P. E. Smoke Committee has offered sound advice to fuel-burning plants on increasing efficiency and smokeless operation. Notifying the Louisville Coal Institute of violators, so that a combustion engineer could be dispatched to troubled plants using coal, has served to abate the smoke problems. It was found that good public relations, along with sound engineering, is the key to a working program. The newspapers, as well as television and radio stations have given excellent cooperation in publicizing the program. Weekly training sessions for the staff have added to the department's efficiency.

1176

Martine, W. R.

1954

TOWARDS CLEAN AIR VIA SMOKELESS ZONES.
Smokeless Air, v. 24, Summer 1954: 198-201.

DLC (TD494.S433, v. 24)

In order to establish a "smokeless zone," it is first necessary to designate a specially selected area by an order made under powers obtained by a local act, and confirmed by the Minister, there being normally the proviso that the area may later be extended. The emission of smoke from premises to which the order applies is prohibited with provision for recurring penalty except where it can be shown that the smoke arose from an appliance suitable for authorized fuel and properly

maintained and used, and that it resulted from the burning of that authorized fuel, or of other fuel when authorized fuel was not available. The order further specifies authorized fuel or fuels. The corporation may bear all or part of the financial cost of works or adaptation, or the tenant may apply for aid to the county court. All premises within the area are subject to the order with the usual exceptions -- these relating to smoke from railway engines, working of mines, and certain of the metal industries. Prior to submission of an order to the Minister for confirmation, the corporation shall publish details of the order in the *London Gazette* and the local press, stating that objections should be sent to the Minister with a copy to the town clerk within 28 days. If no objection is made, the Minister may confirm with or without modification. If an objection is made, a local inquiry must be held, and its report considered before confirmation. Notice of confirmation must be published and posted, the order going into effect 6 months later.

1177

Mavrodineanu, R.,

and J. Gwirtsman.

1955

PHOTOELECTRIC END-POINT DETERMINATION IN
THE TITRATION OF FLUORIDES WITH THORIUM
NITRATE. *Contr. Boyce Thompson Inst.*, v. 18,
Apr.-June 1955: 181-186, illus.

DLC (QK1.B865, v. 18)

A description is given of a photoelectric filter photometer functioning as a comparator for the determination of the end point in the titration of fluorides with thorium nitrate in the presence of sodium alizarinsulfonate. It is a balance-type instrument consisting of a nearly monochromatic light source, two glass cells for the solutions, and two barrier-layer photoelectric cells connected in opposition. A mirror galvanometer mounted in parallel acts as a zero indicator. The instrument is directly supplied by the 115-volt line and is stable and sensitive. Its use makes possible the titration of 1 micron/g fluorine in 250 ml. of solution, one determination requiring 10 min. When equipped with adequate supplementary parts, it can also be used for the transmission measurements of colored solutions as well as a nephelometer or fluorometer. (Authors' summary)

1178

Mavrodineanu, R.

1956

GLASS FLOWMETER WITH INTERCHANGEABLE
CAPILLARIES. *Contr. Boyce Thompson Inst.*, v. 19,
July-Sept. 1956: 321-322, illus. DLC (QK1.B865, v. 19)

An instrument designed for dispensing sulfur dioxide and hydrocarbon gases into fumigating cabinets is described. The flowmeter consists of a large scale concentric differential manometer connected to a capillary and a U tube. The delivery can be carried over a wide range by using capillary tubes of different diameters and lengths. The gas to be measured passes through the apparatus and the resulting pressure is measured in the differential manometer by using

colored mineral oil as an indicating liquid. The flow-meter can be calibrated for various purposes.

1179

- Maxon, W. D., and M. J. Johnson. 1952
CONTINUOUS PHOTOMETRIC DETERMINATION OF CARBON DIOXIDE IN GAS STREAMS. *Analyt. Chem.*, v. 24, Oct. 1952: 1541-1545, illus.
DLC (TP1.I615, v. 24)

The method described is designed to fill the need for an easily fabricated system to determine carbon dioxide continuously in gas streams. It makes use of the equilibrium between gaseous carbon dioxide and aqueous bicarbonate ion, and its photometric measurement using the indicator phenol red. It has been investigated for determination of carbon dioxide concentrations in the range 0.06 to 12%, and exhibits a standard deviation of about 2 parts/100 throughout. It may be used continuously for periods of indefinite length, provided that minor adjustments are made every 12 hr or more. (Authors' abstract in part)

1180

- Meadley, A. H., J. G. Colvin, and H. J. Gamble. 1957
MITIGATION OF AIR POLLUTION IN SINTER PLANTS. (Abstract of paper Presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). *Smokeless Air*, v. 28, Winter 1957: 125.
DLC (TD884.S855, v. 28)

The Iron and Steel Industry, with its variety of processes and equipment, presents a diversity of problems in air pollution. The sinter plant, where hot, dusty materials and gases are handled continuously is probably one of the most difficult sections of the industry in which to control dust. At the Corby works of Stewarts and Lloyds, Ltd., investigations have been carried out over the past eight years to find the degree of dust dispersal from the various sources, and, as a result of these investigations, to determine the most suitable equipment to deal with this problem. The results at times have been discouraging but it is now considered that the future will show very marked improvements in the control of dust at the sinter plants. (Quoted in full)

1181

- THE MECHANICAL ENGINEER AND CLEAN AIR, AN IMPORTANT CONFERENCE. *Smokeless Air*, v. 27, Spring 1957: 177-182. DLC (TD884.S855, v. 27)

Summaries of papers presented at a conference of the Institute of Mechanical Engineers (U.K. Inst.) are listed. These include: (1) The Efficient and Smokeless Combustion of Coal and Fuel Oil in Large Boilers; (2) Present Performance and Scope for Improvement in Power-Station Flue Gas Washing Equipment for the Removal of Sulfur Dioxide; (3) Present Performance and

Scope for Improvement in Power Station Electrostatic Precipitators; (4) Mechanical Grit and Dust Collectors; (5) Means for Prevention of the Emission of Grit, Dust, and Smoke from Coal-Fired Industrial Boilers; (6) Dust Problems of the Iron and Steel Industry; (7) Practical Aspects of Dust Control in the Cement Industry; (8) The Present Position and Scope for Improvement in Ceramic[s] Works; (9) Air Pollution Prevention in the Chemical Industry; (10) Foundry Atmospheres; (11) Air Pollution Research in Coal Mines and its Bearing on Air Pollution above Ground; (12) Air Pollution from Road Transport (4 aspects); (13) Elimination of Smoke from Locomotives; (14) Ships in Port; (15) Instruments and Automatic Control; and (16) Education and Training of Boiler Operators.

1182

- Meetham, A. R. 1956
ATMOSPHERIC POLLUTION: ITS ORIGINS AND PREVENTION. London and New York, Pergamon Press Ltd., 1956. 302 p. DLC RA576.M4, 1956)

This book outlines the subject of atmospheric pollution in a broad way. It is intended both for the professional worker in the field and for the many citizens who are aware of the degree of pollution and helping in the fight against it. The origin of fuels and the types of fuels, of domestic fires, of fuel burning appliances, and of industrial processes are summarized. Sources of atmospheric pollution are discussed, such as smoke, ashes, and other particles, as well as sulphur dioxide and other exhaust gases derived from combustion of fuels, from chemical works, or from other "offensive" industries. Measurement of pollutants, distribution in Great Britain, economic aspects and prevention of air pollution are outlined. A chapter on The Law and its Administration discusses the Alkali Act, Works Regulation Act of 1906, the Public Health Act of 1936, the Manchester Corporation Act of 1946, and the anti-smoke laws in the United States. This edition includes a new chapter covering morbidity attributed to smog, physics of fog, precautions against air pollution, pollution from nuclear reactions, pollution from petroleum products, and recent trends in Great Britain. A bibliography is added which was prepared independently of the very short bibliographies given at the ends of chapters.

1183

- Meigel, R. 1955
FUME ELIMINATION MAY BE ONLY HALF THE STORY. *Industry and Power*, v.69, Dec. 1955: 47-49. LC (TJ1.N7, v. 69)

Exhaust gases from a Detroit, Mich. phosphate anhydride manufacturing plant have been cleaned of irritants by catalytic combustion. Fumes are passed through the combustion element of crimped steel alloy ribbons that have been electrolytically coated with a platinum alloy catalyst. Combustion is complete whether the fumes are present in traces or in concentrations approaching a flammable range. The reaction starts at temperatures of 250° to 300° direct combustion

requires temperatures up to 1400°F. Once the unit is in operation, a portion of the hot exhaust gases are fed back into the inlet to heat incoming fumes to ignition temperature. The preheat burner is shut off and the unit becomes self-sustaining. The 28 units in operation have required no maintenance during 6 yr of use, and they still possess 75% of their original activity, which is more than enough to provide odor-free combustion of the fumes.

1184

Meigs, J. W., and J. P. W. Hughes. 1952

ACUTE CARBON MONOXIDE POISONING: AN ANALYSIS OF ONE HUNDRED FIVE CASES. Arch. Indus. Hyg. and Occupat. Med., v. 6, Oct. 1952: 344-356.

DLC (RC963.A14, v. 6)

An analysis is presented of findings in 105 patients admitted to the Grace - New Haven Community Hospital, Conn. between Jan. 1, 1920 and Dec. 31, 1948, with a diagnosis of acute carbon monoxide poisoning. A number of manifestations previously considered unusual were shown to be common in this series, namely, skin lesions, transient respiratory findings, excessive sweating, liver enlargement, localized pain or soreness, and localized edema. All these signs except pain or soreness and edema were shown to correlate statistically with severity of poisoning, as did several others including temperature of 102°F or higher, respiratory rate of 30/min or higher, and leucocyte count of 18,000/cc or higher. Several manifestations which were almost as common in patients with mild as with severe poisoning, were thought to be precipitated by responses of the autonomic nervous system and the extent of response to be a function of the individual more than of the degree of intoxication. The signs which correlate with severity of poisoning may be manifestations of direct hypoxic injury to the oxygen-sensitive cells of the brain, as well as stimulation of the pituitary-adrenal mechanisms. (Authors' abstract in part)

1185

Meyer, A. F., Jr. 1956

THE EFFECTS OF AIR POLLUTANTS ON MAN AND ANIMALS. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution" ... Bulletin Series no. 83 ..., Sept. 1956, p. 10-13. DLC-Sci.

This discussion centers on atmospheric pollutants arising from the activities of man, e.g., gases, mists, smokes, dusts, vapors, and odors. The range of effects of these pollutants on man, presented in order of increasing seriousness, follows: "(1) accepted by the mass of the population without complaint or physiological harm; (2) nuisance, but not actually harmful to health; (3) production of adverse effects after long-term (many yr) exposure without apparent symptoms of the exposure for a major portion of the period; (4) production of adverse effects after moderate exposure (months or yr) without immediate onset of symptoms; (5) harmful

effects after a few days exposure, and (6) prompt illness with possible death after exposure for a very short period such as hr or a few days." In addition, a more general classification of atmospheric pollutants is made: (a) "those which are primarily irritants or constitute a psychological nuisance, and (b) those which present either long-range (chronic) or short-term (acute) health effects." It is emphasized that the threshold-limit values applied in industrial hygiene engineering work are not applicable, generally, to community air pollution problems. However, "effects of air pollutants may be described in the same terms as developed by Henderson and Haggard for use in industrial hygiene work." These include irritants, asphyxiants, anesthetics and narcotic materials, systemic poisons, particulate material other than systemic poisons (e.g., fibrosis-producing dusts), and materials causing complex systemic responses (e.g., carcinogens). It is pointed out that under certain conditions nonspecific respiratory irritations may result from the presence of a combination of pollutants, and lead to the production of additional stress in individuals already suffering from circulatory and respiratory disorders. Caution is advised with regard to the comparison of the effects of atmospheric pollution on man based on findings using experimental animals.

1186

Middleton, J. T., and A. O. Paulus. 1956

THE IDENTIFICATION AND DISTRIBUTION OF AIR POLLUTANTS THROUGH PLANT RESPONSE. Arch. Indus. Health, v. 14, Dec. 1956: 526-532, illus. DLC (RC963.A14, v. 14)

A review of the literature indicates that the response of plants to air pollution is quite specific, that plants may serve as a means for accumulation of air pollutants for later chemical analysis, and that the amount of plant damage may serve as indicators of air pollution. A state-wide (Calif.) experimental survey was conducted during 1955 in which damage, or lack of it, to 4 categories of crops (field, flower, fruit, and vegetable), and to a miscellaneous group, was reported by the use of IBM cards. A total of 2668 reports indicated 544 cases of damage. The toxicants responsible for plant damage were recognized, in decreasing order of importance, as oxidized hydrocarbons (smog), ethylene, and fluorides. No specific reports were made for ammonia, chlorine, hydrogen sulfide, nitrogen oxides, or ozone. The lack of reports of damage from ozone was of special interest since ozone has been credited with being responsible for a significant part of the total air pollution in urban areas of Los Angeles and San Francisco (Calif.). Accidental spillage of industrial effluent was responsible for the occasional reports of sulfur-dioxide damage. The common occurrence and widespread distribution of ethylene and smog, or reaction products from the oxidation of hydrocarbons, emphasize the need for research and abatement programs on a fairly wide, rather than a local basis.

1187

- Middleton, J. T., 1956
A. S. Crafts, R. F. Brewer, and O. C. Taylor.
PLANT DAMAGE BY AIR POLLUTION. Calif. Agric.,
v. 10, June 1956: 9-12, illus. DA

The injurious effects on agricultural crops in the Los Angeles area caused by the air pollution of the following air-borne toxicants is presented: ethylene, fluorides, herbicides, smog, ozone, and sulfur dioxide. The sources of toxicants, the harmful concentrations, symptoms observed, and the effect on plants are presented. Examples of plant response are illustrated.

1188

- Milburn, R. H., 1957
W. L. Crider, and S. D. Morton.
THE RETENTION OF HYGROSCOPIC DUSTS IN THE
HUMAN LUNGS. Arch. Indus. Health, v. 15, Jan.
1957: 59-62, illus. DLC (RC963.A14, v. 15)

Using Findeisen's model (Arch. ges. Physiol., v. 236, 1935: 367-379) to represent the history of particles passing through the lungs, the rehydration dynamics of 3 different initial sizes of sodium chloride and of gelatin-phosphate was studied, and their retention in the human lungs was compared with those of inert (nonhygroscopic) droplets. It is concluded that the lung retention of aerosols of hygroscopic materials is increased over that of otherwise comparable nonrehydrating substances.

1189

- Miller, R. D., 1958
SMOKE DENSITY RECORDING. Instrum. Practice, v.
12, Mar. 1958: 249-252, illus. DLC (TA165.I58, v. 12)

To keep smoke emission below the specified limits of the Clean Air Act, 1956, passed by the British Parliament, primary detection of effluents in industrial plants is achieved with the use of a photoelectric cell system. The amount of obscuration provided by the stack gases and the resultant reduction in photo-cell output is related to the measurement of smoke density across the stack at the point of installation. Factors affecting satisfactory operation of these units include proper lens cleaning methods and adjustments to insure correct reception of the electric beam. Recording devices are not required by law; but in most plants, the advantages to be gained from the use of full-scale recorder-controller outweighs the financial considerations by the improved efficiency in plant operation.

1190

- Mills, C. A., 1953
OCCUPATION AS A FACTOR IN THE COMMUNITY
HEALTH HAZARDS OF AIR POLLUTION. Amer.
Jour. Med. Sci., v. 226, Aug. 1953: 177-178.
DLC (R11.A5, v. 226)

This is a continuation of a statistical study in Chicago, Ill. (Amer. Jour. Med. Sci., v. 224, 1952: 403) intended to aid in clarification of the problem of the community health hazards of urban air pollution. The current study compares the death rates from pneumonia and respiratory tract cancer in the city's cleanest and dirtiest areas on an occupational basis. It is concluded that while urban air pollution cannot be said to be responsible for the increased incidence of lung cancer it does seem to be one significant factor in this increase. Any factor associated with a doubling of the cancer rate is certainly significant, especially when the doubling can scarcely be linked to housing, nutritional state, socio-economic status, or any other environmental factor except irritants in the air breathed. (Author's abstract in part)

1191

- Mingle, J. G., 1952
REPORT ON INDIANAPOLIS. Air Repair, v. 1, Feb.
1952: 29-32. DLC

This report of the Indianapolis (Ind.) Bureau of Air Pollution Prevention outlines the general procedure of correction used by the Bureau in eliminating the sources of air pollution. A statistical analysis of the types of coal-burning, oil-fired, and gas-fired units in the district is presented. Smoke abatement in commercial and industrial plants has been accomplished by the installation of high pressure boilers and mechanical stoker equipment, and to a lesser extent by the operation of overfire air systems, the conversion from coal to oil-firing, and a greater use of lower-volatility coal. The progress made by commercial and industrial plants, public utilities, and railroads in pollution control is given.

1192

- Mittler, S., 1957
M. King, and B. Burkhardt.
TOXICITY OF OZONE. Arch. Indus. Health, v. 15,
Mar. 1957: 191-197. DLC (RC963.A14, v. 15)

Repeated exposures to 2.4 ppm of ozone induced some hemorrhage and edema in lungs of rats. Adaptation to ozone was noted after 32 hrs of accumulative exposure. Twenty per cent of 102 mice died after a continual exposure to 2.4 ppm of ozone for 341 hrs. Chronic exposure to ozone decreased the weight gain in young rats, and concentrations greater than 1.2 ppm and longer than 7 hrs per day significantly affected the growth of young rats. The 0.1 ppm value as the maximum allowable concentration of ozone for an eight-hour workday appears to be reasonable. Ozone did not react or react with the blood of chronically exposed animals.

There was no change in hematocrit or hemoglobin values. Tables are included. (Authors' abstract)

1193

1954
MODEL TRACES INDUSTRIAL SMOKING HABITS. Chem. Eng., v. 61, Sept. 1954: 136. DLC (TN1.M45, v. 61)

A method of testing the dispersal of industrial wastes by simulated, scale-model conditions with the use of a wind tunnel is illustrated. The model described is used for research at New York University. A light beam-phototube combination detects exactly when and where the plumes touch the ground. Means of controlling the contributing factors to downwash of gases can be studied by this method.

1194

Monkhouse, A. C. 1952
PROGRESS IN DOMESTIC HEATING RESEARCH. Jour. Inst. Fuel, v. 25, May 1952: 103-107.
DLC (TP315.16, v. 25)

A review of some of the more important aspects of domestic heating is presented. Two chapters deal with the prevention of smoke and production of smokeless solid fuels. Adequate mixing of smoke with air, and its subjection to a sufficiently high temperature are the problems which must be solved before smokeless combustion can be achieved. The improved methods obtained so far are not applicable to the lower rates of burning and the more common coal-burning appliances. To attain a continuous record of smoke density measurement, a photo-electric cell and recording potentiometer is generally used. To stabilize the electric supplies to the light projectors and photocell amplifiers, Hales, (in the B.C.U.R.A. and Radiation, Ltd. laboratories) has developed a balanced system in which the light beam passing through the smoke is balanced against a light beam which traverses a rotating wedge of smoke-coloured glass. Because of the small amounts of smokeless fuel available for the domestic market, experiments have been undertaken in a setting of intermittent vertical chambers at the Fuel Research Station, to find the effect of change in conditions of carbonization on the combustibility of the coke produced. Tests in a stool-bottom grate showed that 8 hours of carbonization at normal high temperatures produced a more easily ignitable coke than 12 hours at the same temperatures. This involved a decrease of about 18% in the amount of gas produced per ton of coal, although the output of gas per retort per day was increased by about 24%. Temperatures of 1,150°C in the bottom flues and 850°C in the top, and a period of carbonization of 8 hours produced a coke of fairly high bulk density (25 lb/cu ft) with low critical-air-blast value, that ignited easily and could be burnt in a stool-bottom grate. This improvement in quality was obtained with a loss of 25% in the output of gas per ton of coal, but the output per retort was maintained at its normal value.

1195

Monkhouse, A. C. 1958
THE COMBUSTION OF COAL. Chem. and Indus., no. 3, Jan. 18, 1958: 51-63, illus. DLC (TP1.S6332)

Aspects and problems of coal consumption, the constitution of coal, the theory of combustion, and the applications of coal use are reviewed. Methods of coal burning both fixed-bed and suspension combustion are compared according to standards of efficiency. Developments are described in effecting economical and complete combustion by means of mechanical stokers, pulverized fuel firing, spreader stoker firing, cyclone firing, and coal-fired gas turbines. Difficulties in obtaining efficient combustion of coal in domestic appliances as compared to industrial installations, are due to such causes as use of shallow beds, inferior grades of coal, low combustion rates and, consequently, lower temperatures, and insufficient draught.

1196

Moore, G. E., 1957
and A. F. W. Cole.
THE CONCURRENT DETERMINATION OF SULFUR DIOXIDE AND NITROGEN DIOXIDE IN THE ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 25-28. DLC (TD883.A48, v. 7)

Using 3 modified automatic impingers, concurrent determinations have been made at Windsor, Ontario, of low concentrations of sulfur dioxide by the conductometric and fuchsin methods and of nitrogen dioxide by the Saltzman method. The conductometric determinations yielded consistently higher values for sulfur dioxide than the colorimetric method which was based on the chromogenic reaction of formaldehyde, fuchsin, and sulfite. When the fuchsin values were corrected for the effect of nitrogen dioxide, the colorimetric sulfur dioxide levels agreed quite closely with those estimated by the conductometric method. Nitrogen dioxide levels in the Windsor atmosphere were lower than those found in the Los Angeles, Calif., atmosphere. Charts are included.

1197

Mordy, W. A. 1953
A NOTE ON THE CHEMICAL COMPOSITION OF RAIN-WATER. Tellus (Stockholm), v. 5, Nov. 1953: 470-474, illus. DLC (QC801.T4, v. 5)

A limited number of observations of nitrogen, sodium, and chloride in rainwater made in the Hawaiian Islands are presented. Because of frequent and high rainfall, calculations of the annual amounts of nitrogen received in various island localities are rather large. In one storm, nitrogen was brought down by rainfall at a nearly constant rate although rainfall intensity varied considerably. In general, the concentrations of these elements in Hawaiian rains agree with observations in other oceanic areas. (Author's abstract)

1198

- Moriarty, F. C., and M. M. Fisher, 1952
HOW TO PLAN A WASTE DISPOSAL PROGRAM. Oil and Gas Jour., v. 51, Nov. 17, 1952: 296-7, 299, 301, 302, 314. DLC (TN860.O4, v. 51)

In this discussion of refinery waste disposal and control, the methods used in several of the trouble spots are outlined. In the storage of crude oil, the volume of free vapor is controlled by a compressor system which draws the gases from the tanks continuously, discharging them directly to a furnace where they are burned. Vapors from the gasoline-blending process are recovered in a Hortondome system containing a flexible membrane which provides a compensating volume to receive or discharge vapors displaced in blending. Vent valves and flame arresters are provided in all cases. Flue gases from the catalytic cracking unit are used to neutralize spent-caustic treating solutions. The gases are subsequently fed through a steam-aspirated burner before being discharged into the atmosphere.

1199

- Morley, N. J., and J. D. Tebbens, 1953
THE ELECTROSTATIC PRECIPITATOR DILUTION METHOD OF FLOW MEASUREMENT. Amer. Indus. Hyg. Assoc. Quart., v. 14, Dec. 1953: 303-306. DLC (RD963.A135, v. 14)

A simple and accurate calibration of flow through an electrostatic sampler can be made by using the precipitator as a suction source, and measuring the rate of dilution of a known gas concentration contained in a tank of measured volume. As the electrostatic precipitator withdraws air from the tank, room air enters freely, and is mixed continuously with the remaining air/gas mixture. The data from periodic analysis of the gas mixture will plot as a straight line on semilog paper, with the slope of the line giving air changes/min, which can be converted to the volume rate of the air withdrawing instrument. This technique offers no obstruction to the airflow through the electrostatic precipitator. Results are reproducible within 4%. Charts and formulas for calibration are given. (Author: abstract)

1200

- Morris, H. E., 1954
INTEGRATED POLLUTION CONTROL. Petroleum Refiners, 33, Dec. 1954: 229-231. DLC (TP460.A1P4, v. 33)

The disposal of waste and byproducts involved in the manufacture of styrene, acetylene, HCN, acrylonitrile, ethylenedichloride, and hydrogen chloride by the Monsanto Chemical Company, Texas City, Tex., is discussed. Flare stacks, boilers, and incinerators are included in the disposal system. A flow diagram of the waste disposal system is given.

1201

- Morriss, H. E., 1954
HOW MONSANTO CONTROLS AIR AND WATER POLLUTION. Oil and Gas Jour., v. 53, June 28, 1954: 114-116. DLC (TN860.O4, v. 53)

The disposal of pollutants from the Monsanto Chemical Co., Texas City, Texas, involves the elimination of wastes from styrene, acrylonitrile, and vinyl chloride production. Disposal methods are discussed for the treatment of waste catalysts, soot formation from acetylene production, cyanide wastes, and acrylonitrile leaks or spills. The abatement methods used include: (1) burning organic wastes; (2) monitoring of leaks by "leak" committees; (3) azeotropic distillation to recover hydrocarbons from waste water; (4) steam-stripping for the removal of acrylonitrile wastes; and (5) dilution of wastes where applicable, to obtain harmless concentrations. A flow sheet is given of the waste disposal system employed.

1202

- Morrow, C. H., W. C. Holton, and H. L. Wagner, 1953
INVESTIGATION OF GRAVITY REINJECTION OF FLY ASH ON A SPREADER-STOKER-FIRED BOILER UNIT. Trans. Amer. Soc. Mech. Engineers, v. 75, Oct. 1953: 1363-1372. DLC (TJ1.A7, v. 75)

A furnace at the J. I. Case Co. plant at Racine, Wis., is designed to operate without producing smoke with more than a no. 1 density [Ringelmann]. The flue gas passes through an air heater into a divided duct which has 2 separate dust collectors, rated at 46,000 cu ft/min at 275°F. The dust is carried through 8-inch pipes to a dust control valve, where each carrier pipe divides into 4 3-inch pipes to discharge the dust into the furnace. The dust loadings at the furnace outlet, boiler outlet, and stack are tabulated. In all cases, the dust is below the 0.85 lb/1000 lb gas recommended by the Model Smoke Law Committee of the ASME (American Society of Mechanical Engineers).

1203

- Mottara, G., 1952
PENETRATION OF DUST PARTICLES AND SITES OF DUST STORES IN PNEUMOCONIOSIS. Brit. Jour. Indus. Med., v. 9, Jan. 1952: 65-69. DLC (RC963.A23, v. 9)

The penetration of dust particles into the connective tissue and lymph is considered. Evidence is largely against an active migratory cellular mechanism. Deposits of inert dusts collect in the peripheral bronchioles-arterial field in relation to the origin of the principal lymph channels. This probably occurs because the particulate substances are difficult to drain. Lymphatic drainage is further hindered by hyperplasia, and alveolar nodules eventually form.

1204

Mullen, P. W.

1952

RAPID VOLUME AND CONCENTRATION CALCULATIONS IN INDUSTRIAL AIR ANALYSIS. *Analyt. Chem.*, v. 24, Feb. 1952: 417-418. DLC (TP1.I615, v. 24)

A slide rule is described which is designed to correct gas volumes to 25°C and 760 mm of mercury pressure with accuracy sufficient for industrial control purposes. The design may easily be altered to allow correction to any temperature and pressure desired. Additionally, the method may be adapted to calculations relating ppm by volume of most industrial air contaminants retained after sampling in absorbing medium to the volume of standard reagent used to titrate, directly or indirectly, the contaminant in the absorbing medium. (Author's abstract in part)

1205

1957

MULTIPLE ELECTROSTATIC FILTERS. *Air Conditioning, Heating, and Ventilating*, v. 54, Oct. 1957: 128. DLC (TH7201.H4, v. 54)

An electrostatic air cleaner developed by Radex Corp., Chicago, Ill., saves materially in space, face area, and increases capacity. Mechanical filters are connected in multiples and can be withdrawn from the unit for cleaning purposes within a space of 25 inches. Depth of the unit is only 18 in. while the length and height can be varied to fit particular requirements.

1206

Murphy, H. C.

1953

RECENT DEVELOPMENTS IN RESIN-WOOL AIR CLEANERS. *Heating, Piping and Air Conditioning*, v. 25, April 1953: 103. DLC (TH7201.H45, v. 25)

The author investigated air cleaner installations and research laboratories in various parts of Europe. The production of the resin-wool electrostatic air filter has been considerably simplified and improved. Its effectiveness is largely due to the suitable selection of resins and plastics, which should have a volume resistivity of at least 10^{19} ohm-cm. Treatment for oil repellent action extends the effective life of a filter by lessening the deterioration through oil mists. Filter hardness or melting point is also of importance. The depth of air filter beds should be considerably greater, and the gas should travel at a lower velocity, than in filters designed to remove larger particles, as the mechanical collection of these particles is not due to inertia, but to Brownian motion.

1207

Murphy, T.

1955

ON THE FOG FORMATION IN THE PHOTO-ELECTRIC COUNTER. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata*, v. 21, May-Aug. 1955: 28-31. DGE

Photoelectric nucleus counters have been used to measure the amount of light passing through the fog tube before and after the formation of the fog. When operating 2 or more such counters simultaneously with identical samples of air, it has been found that the "minimum reading after expansion" is not a very definite reading, and investigations have been conducted to eliminate this uncertainty. It was concluded that to obtain an accuracy greater than 5%, the present arrangement would have to be modified, the suggestion being made of a return to an earlier rectilinear type of fog tube.

1208

Myers, J. W.,

1953

and R. C. Corey.

FURNACE HEAT ABSORPTION IN A SPREADER-STOKER-FIRED STEAM GENERATOR. *Trans. Amer. Soc. Mech. Engineers*, v. 75, July 1953: 909-923. DLC (TJ1.A7, v. 75)

A study of furnace heat-absorption efficiency under variations of load, excess air, and conditions of over-fire air is discussed. The gas composition in the furnace was determined at the air-heater outlet, and the dust concentration was measured in the stack gases. The overfire-air rate was adjusted to the amount that eliminated excess smoke and dust in the stack gases. A summary of the data and results collected, and properties of the coal and ash, are tabulated in detail.

1209

Nader, J. S.

1957

DUST RETENTION EFFICIENCIES OF DUSTFALL COLLECTORS. (Paper presented at Golden Jubilee Meeting of Air Pollution Control Assoc., St. Louis, Mo., June 4, 1957). *Public Health Service (U.S.)*, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 14 p., illus. DLC-Sci

Dustfall collectors representing the following techniques were tested: (1) dry collection without bafflers, (2) dry collection with bafflers, and (3) unbaffled wet collectors. Experiments included exposure to atmospheric dustfall under weather conditions typical of a temperate climate. A statistical evaluation of the gravimetric analysis data and dust retention efficiencies shows no significant differences among the three types of collections.

1210

Nader, J. S.,

1957

and J. L. Dolphin.

IMPROVED TITRLOG SENSITIVITY. (Paper presented at the Symposium on Atmospheric Chemistry of Chlorine in Sulfur Compounds, at Robert A. Taft Sanitary Eng. Center, Cincinnati, Ohio, Nov. 3, 1957). *Public Health Service (U.S.)*, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. July 1957, 9 p., illus. DLC-Sci

The "Titrilog" is an automatic instrument for continuous recording of concentrations of oxidizable sulfur compounds in gas streams or atmospheres such as hydrogen sulfide, sulfur dioxide, etc. The bromine is electrolytically generated in a solution in which the sulfur compounds are absorbed from the sample gas stream. The titration cell in which the oxidation-reduction reaction occurs forms a part of an electronic feedback amplifying system which controls the bromine-generating current, so that the net rate of bromine generation is at all times equivalent to the rate of absorption of the sulfur compounds. The Titrilog normally has an indicating millimeter and a milliamperere recorder to show the value of the generating current calibrated in terms of the gas under analysis shown in terms of internal resistances in the basic schematic circuit. An improved circuit has been developed by using a Bristol recording potentiometer for measuring the voltage drop across a known fixed resistance controlled by a switch. The method discussed improves the sensitivity of the instrument by a factor of more than 10. A potential improvement factor of more than 2000 was indicated if background noise level were reduced to an insignificant level. Probable sources of noise were noted, indicating that their effects may be minimized by a selective choice of critical electronic components.

1211

Nader, J. S. 1957
AN ODOR EVALUATION APPARATUS FOR FIELD AND LABORATORY USE. (Paper presented at American Industrial Hygiene Assoc. Meeting, St. Louis, Mo., Apr. 25, 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 14 p., illus. DLC-Sci

The development and operation of an odor-evaluation apparatus for use in the field or laboratory have been described. The instrument consists of (1) the odor-free air supply, (2) the odorous-air sampling system, and (3) the calibrated odorous-air supply. Metered air is pumped to a hood which isolates the subject from the environment and in which he detects the odor. This method reduces the individual's participation to a minimum. The instrument has been tested in the laboratory, and data on individual perception thresholds (IPT) of butyric acid, metacresol, methylsalicylate, and toluene have been obtained. An estimate of the population perception thresholds (PPT50) was made for two of these odors. A preliminary test of field usage of the apparatus is discussed.

1212

NAPKO'S FUME CONTROL SETUP. Paint, Oil, and Chem. Rev., v. 129, Mar. 1957: 10-12. D98

The Napko Paint Co. of Houston, Tex., has installed a fume control system that oxidizes effluent gases by catalytic combustion to end products of carbon dioxide and water vapor. The oxidation takes place on the surface of the platinum-coated catalyst element without flame. The installation consists of the combustion unit and a double manifold which collects the fumes and dis-

charges the products of combustion. A preheat burner heats the gases to a combustion temperature of 500°F, preventing the formation of a condensate. Since the reaction is exothermic, the heat liberated causes a sharp temperature rise as the gases pass through the catalyst. This heat is pumped back through the system to preheat the fresh fumes as they come from the cook-kettle. The higher the fume concentration, the better is the efficiency, and the lower is the operating cost. Normally the preheat burner returns to pilot position at peak fuming rates. The expense of fuel composition is estimated at 5 cents/hr. Illustrations and a chart are included.

1213

1952
NATIONAL FUEL POLICY: MEMORANDUM FROM THE [NATIONAL SMOKE ABATEMENT] SOCIETY. Smokeless Air, v. 22, Spring 1952: 110-111.

DLC (TD884.S855, v. 22)

This memorandum was submitted to the Committee on National Fuel Policy, on behalf of the Executive Council of the National Smoke Abatement Society. A former Minister of Fuel and Power, Mr. Noel-Baker, set up the Committee "to consider whether any further steps can be taken to promote the best use of our fuel and power resources, having regard to present and prospective requirements and in the light of technical developments." The National Smoke Abatement Society has long been active in the field of the better utilization of fuel since smoke is one of the consequences of inefficient use of coal. Although the aims of the Society are normally long-term ones, this memorandum deals with matters of immediate concern. It is urged that due emphasis be placed on economic aspects of use or misuse of fuel. In addition to the cost of smoke in terms of health and well-being, other considerations are the material damage it inflicts, the substantial diversion of labor and materials from production to maintenance, and the loss of fuel involved. It is recommended that the policy of requiring new houses to be fitted with improved types of solid fuel-burning appliances be vigorously continued, and that action be taken to prevent the continued manufacture or sale of obsolete grates and ranges. The Society also has proposed prior approval of new industrial fuel burning installations. The Society has for years stressed the importance of training and improving the status of boilerhouse attendants and furnacemen. Financial incentives, subsidies, and other means to accelerate desirable changes, should be considered for both industrial and domestic installations. Consideration should be given as to how the production of the solid smokeless fuels may be assisted or stimulated. The new coal price structure now being considered provides an opportunity for encouraging the production of solid smokeless fuels by establishing a more logical relationship between the costs used for industrial, carbonization, and domestic purposes. The Society advocates the drawing-up of a long-term general fuel policy, even in a very tentative state, in order that momentary expedients do not generate further problems.

1214

Nau, C. A., J. Neal, and A. P. Freund. 1952

AN AUTOMATIC DUST FEED APPARATUS USEFUL FOR EXPOSURE OF ANIMALS TO DUSTY ATMOSPHERES. *Texas Rep. Biol. and Med.*, v. 10, Winter 1952: 874-882, illus. DLC (R11.T4, v. 10)

A dust feed apparatus designed for experimentation on small animals by Stead, Dernehl, and Nau in 1943, was improved to achieve easier control and greater automaticity. Uniform control of humidity and temperature was obtained through air conditioning of the larger laboratory, which supplies the air in the dust room and cools the compressed-air jet that picks up the dust. The dust-laden air from the exposure chamber is conducted to a filter contained in a dust closet consisting of 2 compartments. This method was found to be more effective than the electrostatic precipitation method used previously. The difficulties encountered with the earlier system were overcome by basic changes which are specified.

1215

Neiburger, M., N. A. Renzetti, and R. Tice. 1956
WIND TRAJECTORY STUDIES OF THE MOVEMENT OF POLLUTED AIR IN THE LOS ANGELES BASIN. *Air Pollution Foundation, Los Angeles, Calif. Technical Report no. 13* (v. 2, no. 1), Apr. 1956. 74 p. DLC-Sci

Almost 1000 trajectories were computed showing the paths of air reaching areas in the Los Angeles Basin, Calif., where high concentrations or high values of smog effects were measured. The results of the experimentation are given, and full data are included. Tracer tests indicated that these trajectories give a fairly reliable indication of the movements of contaminants when the inversion is low, but that turbulent diffusion spreads the contaminants some distance around the center of the polluting cloud as it moves. It is pointed out that automobile exhaust gases are estimated to be the largest source of hydrocarbons, oxides of nitrogen, and other precursors of oxidant which create eye irritation in the Basin.

1216

Nelson, R. W., and C. J. Lyons. 1957
SOURCES AND CONTROL OF SULFUR-BEARING POLLUTANTS. *Jour. Air Pollut. Control Assoc.*, v. 7, Nov. 1957: 187-193, illus. DLC (TD863.A48, v. 7)

The effects, sources, and control techniques of sulfur-bearing pollutants are given. Sulfur dioxide, sulfur trioxide, and hydrogen sulfide are the three principal contaminants under discussion. Principal sources of atmospheric sulfur pollutants are, in decreasing order: (1) the combustion of coal; (2) the production, refining, and utilization of petroleum and natural gas; (3) industries making and using sulfuric acid; and (4) smelting

and refining plants of ores, principally copper, lead, zinc, and nickel. The two most important gases for which means of recovery or removal are desired are hydrogen sulfide and sulfur dioxide. Methods of removing hydrogen sulfide are discussed such as the catalytic conversion process and the Girbotol process. The removal of sulfur dioxide from smelter gases and from power plant gases by physical and chemical means is outlined.

1217

Neuberger, N., H. Panofsky, and Z. Sekera. 1956
PHYSICS OF THE ATMOSPHERE. In *Air Pollution Handbook*. New York, McGraw-Hill Book Co., Inc., 1956, Section 4, p. 4-1 to 4-61, illus. DLC (TD883.M35)

Physical properties of the atmosphere that affect air pollution are discussed. The subjects treated include: (1) atmospheric optics; (2) atmospheric electricity; (3) thermodynamics; and (4) the atmosphere in motion. Formulas, equations, and charts are presented.

1218

THE NEW CITY OF LONDON ACT: THE "SQUARE MILE" TO BE SMOKELESS. *Smokeless Air*, v. 25, Winter 1954: 95. DLC (TD884.S558, v. 25)

Some of the provisions of Part II of the new City of London (Various Powers) Act, 1954, are outlined. The purpose of the act is to make a smokeless zone of a sq mi of the city. After Oct. 2, 1953, no smoke is to be emitted from any premises in the city. The penalty is to be no more than £10, with a daily penalty of not more than £5. Two means of defense are recognized: if the smoke arose as a result of using an "authorized fuel," or if such a fuel were not available; or if the furnace or other appliance had been approved as suitable for any kind of fuel, and the fuel had been burned in accordance with the approved instructions. The term "authorized fuel" means coke, anthracite, or any fuel approved by the common council. The occupant of the premises may be able, under certain circumstances, to apply to the Mayor's and City of London Court for financial aid in making alterations. The common council may, by resolution, exclude or defer the application of the provisions to any specified premises. Also, the provisions do not apply to smoke emitted from railway locomotives.

1219

NEW DUST FILTER PROVIDES DOUBLE-ACTION CONTROL. *Plant Engineering*, v. 39, Nov. 1957: 186-189, illus. DLC (TX841.F97, v. 39)

The Day Sales Co., 805 Third Ave., N. E., Minneapolis, Minn., produces a high-efficiency filter and cyclonic separator unit designed for continuous-automatic operation. The dust-laden air travels in a cyclonic

path, depositing heavy particles before entering the filter chamber where fines are removed. Product discharge is handled by rotary valves and cleaning is accomplished without shut-down. The unit employs a high-velocity, reverse air cleaning method (Hersey principle) but differs from former designs in that dust is deposited on the outside of the filter sleeves, which have inner liners.

1220

1952

NEW HAVEN AIR POLLUTION SURVEY COMPLETED.

Air Repair, v. 2, Nov. 1952: 59. DLC (TD883.A48, v. 2)

A 1-yr survey of New Haven, Conn., indicated that it has a comparatively low dustfall. Complaints initiating the survey concerned the black-soot fraction of dust. Findings on vanadium content of dust samples supported the conclusion that stack emissions from burning no. 6 fuel oil contributed only a small amount by weight of total city dust, but a high proportion of carbon. Heavy fuel oils, with coarse particles of petroleum coke, were found to be the most important single cause of ground-level dust. This dust consisted mainly of carbon in the form of petroleum coke and carbonaceous solids (soot) resulting from insufficient combustion of fuel oil.

1221

1952

A NEW INDUSTRIAL AIR FILTER. Heating and Air Treatment Eng., v. 15, Jan. 1952: 13-14.

DLC (TH7201.A4, v. 15)

A method is described for using a woolen fiber medium for air filtration. The fibers are formed into a lap in the presence of finely divided resin. During the process of manufacture, the resins are electrically excited. The charge possessed by the resin plays the important part in arresting the airborne foreign particles. In cases where low efficiencies can be accommodated, the density and compression of the filter can be reduced to permit increased air volumes. Efficiency measurements can be made by testing a cloud of size-controlled methylene blue particles. A performance chart is included of tests involving 1-in. filter panels for methylene blue removal. The filters fit into an outer case of the filter unit and can be assembled between header ducts to build a completely enclosed filter system to any desired capacity.

1222

1952

NEW JERSEY CONSIDERS ATMOSPHERIC POLLUTION.

Heating, Piping and Air Conditioning, v. 24, Apr. 1952: 134. DLC (TH7201.H45, v. 24)

The Governor's Conference and Exhibit on Atmospheric Pollution was held in Trenton, N. J., on Feb. 19-20, 1952. Four sessions were held. The first session was devoted to papers on general aspects of air pollution including health and legal problems. Three papers related to "Determining Effects of Air Pollution" were presented at the second session. The next session was devoted to a discussion of air pollution control equipment.

The final session consisted of a presentation of 5 papers dealing with typical, successful examples of air pollution abatement. The exhibit included demonstrations of equipment used in air pollution control.

1223

1955

NEW METHOD IDENTIFIES IMPURITIES IN AIR. Chem. and Eng. News, v. 33, 1955: 2378.

DLC (TP1.C35, v. 33)

Battelle Institute has developed a new method for identifying minute concentrations of impurities in the air, involving infrared spectrophotometry, which is declared to be extremely sensitive and accurate. The procedure is based on the principle that light is absorbed in proportion to the amount of impurity in the air. By projecting a beam of infrared light through a 175-foot gap of air and measuring the type and amounts of light absorbed, small concentrations of impurities can be analyzed both qualitatively and quantitatively. This method might be utilized moreover in research aimed at evaluating the hazards to humans and animals of crop-spray residues remaining in the air, or in prospecting for petroleum and natural gas, since it is sensitive to extremely minute quantities of vapors arising from the ground.

1224

1955

NEW PORTABLE AIR CLEANER. Smokeless Air, v. 26, Winter 1955: 106. DLC (TD884.S855, v. 26)

Announcement is made of the incorporation of an electrostatic air cleaner in a portable unit for home use. It has been developed to extract fine particles of dust, pollen, fibers, and smoke in rooms. The unit is especially useful for removing smog particles and other impurities which distress sufferers of asthma and bronchitis.

1225

1953

NEW RUSSIAN PROCESSES. Chem. Eng., v. 60, Mar. 1953: 351-352.

Russian industrial processes for eliminating sulfur dioxide from plant effluents are reviewed. A process of treating flue gases by oxidizing sulfur dioxide in the presence of a manganese catalyst yields 20% sulfuric acid. Chemical plant flue gases can be oxidized by air, the unoxidized sulfur dioxide being absorbed by calcium hydroxide and treated with sulfuric acid to extract 93% of the total sulfur dioxide in the gas. The following methods of extracting sulfur dioxide from gases of low SO₂ content are indicated: absorption with lime, absorption with a suspension of magnesium oxide, treatment with sodium carbonate, and absorption with ammonia.

1226

- 1957
NEW SMOG MASK. Jour. Amer. Med. Assoc., v. 163,
Mar. 2, 1957: 768. DLC (R15.A48, v. 163)

Postmen in the London and Manchester, (England) areas have participated in trials of a new lightweight smog mask. The mask is made of a transparent plastic material. It protrudes in front of the face, and does not fit closely over the mouth or nostrils. A small container produces ammonia vapor from crystals to combat the polluted air.

1227

- 1958
NEW SMOKELESS-ODORLESS INCINERATORS PROVIDE ANSWER TO POLLUTION PROBLEM. Amer. Gas Jour., v. 185, Apr. 1958: 14-16, illus.
DLC (TP700.A5, v. 185)

A new appliance-style smokeless and odorless household gas incinerator is described. The unit includes a double-burning operation with two stages: the first (combustion) stage mixes air and the waste gas which is subjected to heat and flame; the second stage is an after-burner arrangement. The interior may be compartmented, so that one flame does both jobs or there may be more than one flame and an after-burner arrangement. The incineration is capable of disposing of almost any sort of waste material except non-combustibles, such as metal or glass. Typical capacity is about 1 1/2 bushels.

1228

- 1952
NEW SULPHUR DIOXIDE DETECTOR. Chem. Age, v. 67, Nov. 1, 1952: 614. DLC (TP1.C33, v. 67)

Announcement is made of a new American device for detecting sulphur dioxide content in the air in an effort to prevent further "smog" disasters. The device consists of a small glass tube filled with a vanadate-silica gel which turns from yellow to green or blue in the presence of the gas; concentrations down to 5 ppm can be detected. Another gel which showed promise on tests has a vanadate-silica base which turns from white to pink or red-brown, the depth of the color indicating the concentration of the sulphur dioxide in the atmosphere.

1229

- 1953
NEW YORK AIR. Heating and Ventilating, v. 50, July 1953: 138, 141. DLC (TH7201.H4, v. 50)

The New York City Commissioner of Air Pollution Control revealed that many of the incinerators in the city are in need of settling chambers or secondary combustion units. These incinerators may be shut down unless the existing condition is corrected. The agency is already taking action against owners of incinerators that are contributing fly ash and smudge to the atmosphere. An unsolved problem, he said, concerns the spreading

of air pollutants from New Jersey into New York City.

1230

- Nichol, A. A., and others. 1957
THE DETERMINATION OF THE FLUORIDE CONTENT OF NATURAL VEGETATION. Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 239-243.
DLC (TD883.A48, v. 6)

An investigation was made to determine the effect upon livestock caused by eating fluoride-contaminated vegetation. A procedural outline was established which involved evaluation of vegetation damage; levels of fluoride concentration at various sampling points were plotted on a map, isofluors being drawn to connect points having the same fluoride concentration. It is concluded that 30 ppm is about the maximum fluoride concentration in forage that livestock with developing teeth can ingest without producing teeth markings.

1231

- Nickol, G. B. 1957
RANK ODOR METHOD FOR EVALUATING STACK GASES. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 55. DLC (TD883.A48, v. 7)

A procedure for evaluating odors in stack gases is presented. Sampling trains were connected to the exhaust systems before and after the scrubber. Equal volumes of gas were passed through the respective sampling trains at equal rates. Effluents from freeze-out traps were completely odorless. A concentration approaching but above the threshold level was determined on the freeze-out from unscrubbed gas by submitting various dilutions of the material to a test panel. Evaluation of the effectiveness of a scrubber in removing odors from stack gases leads to the conclusion that odors were reduced to roughly 1/10 of the original.

1232

- Nickola, P. W. 1954
A PORTABLE METEOROLOGICAL MAST. (Paper presented at the 129th National Meeting of the American Meteorological Society, Pullman, Washington, June 23-24, 1954). [Abstract]. Bull. Amer. Meteor. Soc., v. 35, Apr. 1954: 184. DLC (QC851.A6, v. 35)

A portable meteorological mast for use in micrometeorological studies in the lowest 42 ft of the atmosphere is described. The various sampling equipment is positioned vertically along the mast in order to investigate the distribution of temperature, wind, and particulate matter with height. The mast and associated equipment are a self contained unit, a portable generator providing the power needed.

1233

- Noble, W. M. 1956
AIR POLLUTION RESEARCH. Lasca Leaves, v. 6,
Winter 1956: 3-6. DA

In about 1943 it was first noticed that certain crops could no longer be profitably grown because of the effect on vegetation of what is commonly called smog. In spring 1949, the Los Angeles County Air Pollution Control District began a study of the problem realizing both that there was a terrific economic loss to California growers and that this particular injury always appeared following a period of eye irritation and low visibility. This latter observation indicated that plants might be used to detect the presence of such pollutants and to determine the geographical area affected. Extensive studies resulted in the discovery by Dr. Haagen-Smit that compounds present in gasoline would on combination with ozone cause this injury. Another study established the fact that car exhaust fumes combined with ozone would also readily produce this type of injury. Despite extensive studies, no other sources have been found which will cause the same symptoms. Fifteen small test stations, where half the number of test plants can be exposed to filtered, smog-free air while the other half are exposed for 24 hours to unfiltered air, have been set up to roughly cover the area including San Fernando, Pomona, Anaheim, Long Beach, and Westwood Village. The appearance of the injury on the plants varies considerably depending upon the anatomy and physiology of the leaves and upon the intensity of the pollution. The sensitivity of the plant is affected greatly by its environment; an abundance of water usually increases sensitivity. The injury occurs on the plant where the most recently matured cells are found. A partial list of sensitive and resistant plants has recently appeared in a previous issue of this journal [Middleton, Darley, and Kendrick. Lasca Leaves, v. 5, Winter 1955: 6-11.] Extensive studies of trees and shrubs is now going on.

1234

- Nolan, P. J., 1955
and E. Kuffel.
COAGULATION AND DIFFUSION ON ENCLOSED
NUCLEI. (Paper presented at the First International
Symposium on Condensation Nuclei, Dublin, Ire., Apr.
1955). Geofisica pura e applicata (Milano), v. 31,
May-Aug. 1955: 97-106. DGS

In experiments carried out with ultra-small nuclei, in which the sedimentation loss is negligible, it was found that the coefficient of the linear diffusion term in the decay equation varies as the square root of the diffusion coefficient. An interpretation of this relationship which takes convection into account is suggested. Previous decay experiments are examined in the light of the new relationship. (Authors' abstract in part)

1235

- Nolan, P. J., 1955
and E. Kuffel.
PRODUCTION OF NUCLEI FROM AMMONIA AND

- NITRIC ACID. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). Geofisica pura e applicata (Milano), v. 31, May-Aug. 1955: 50-53. DGS

The size and charge distribution of condensation nuclei obtained by passing air over ammonia and nitric acid are examined. In agreement with McHenry (Geophysical Bulletin No. 6, School of Cosmic Physics, Dublin Institute for Advanced Studies, 1953), it was found that the average radius is less than 1.0×10^{-6} cm. The heterogeneity of the nuclei is discussed. (Authors' abstract)

1236

- Nonhebel, G. 1956
THE DENSITY OF WASHED PLUMES FROM POWER
STATIONS. Smokeless Air, v. 26, Spring 1956: 182-
183. DLC (TD884.S855, v. 26)

In discussing Dr. Scorer's paper on "An Effect of Gas Washing at Battersea Power Station" (Smokeless Air, v. 26, Autumn 1955: 26-28), Nonhebel states that the photographs used in the text are not representative of the general conditions existing at the Battersea Power Station (London). In practice, the plumes, following gas washing, do not always have a tendency to fall, but only dip downward occasionally. This is partly because the gases are discharged with appreciable velocity, and partly because frequently there are upward currents of air past the chimneys. The Battersea plant is now undergoing extensive overhauling. In 1954 the efficiency of the gas washing plant was 83% as compared with 97% for a modern plant at Bankside (London) using the same process. Future gas washing plants are likely to employ a system of washing in which the water is recirculated; in these systems the flue gases are cooled only to their wet bulb temperature, 48°C; no mist is formed in the scrubber, but the gases are saturated with water vapor. The washed gases are appreciably less dense than the surrounding air, though not of as low a density as unwashed gases. (Quoted in part)

1237

- Norcliffe, D. C. 1952
SMOKELESS ZONES AND PRIOR APPROVAL. II.
PRIOR APPROVAL. [From papers by the Coventry
Smoke and Factory Inspectors, read at a Meeting of the
Sanitary Inspectors' Association in Coventry, on
November 15, 1951]. Smokeless Air, v. 22, Spring
1952: 122-125. DLC (TD884.S855, v. 22)

As a method of control of atmospheric pollution in an area, the "Prior-Approval" system, though less spectacular than the "Smokeless Zone" method, has a more subtle effect in that control is applied to individual cases as they arise. Less opposition is produced than that which may arise from an enactment prohibiting all smoke emission. The principle of prior approval is not a new one since it has been in operation in various localities but without the backing of municipally sponsored Acts of Parliament. A form of prior approval has

been operating nationally for a number of years in connection with installations in plants which must be registered under the Alkali, etc., Works Act. The Acts and Orders which govern these plants are the direct concern of the Ministry of Health and are administered by a Chief Inspector and Regional and District Inspectors. When the prior approval method of smoke prevention control is more fully developed, it will undoubtedly require a deep knowledge of combustion technicalities on the part of the Smoke Inspectors. Some of the difficulties met with in the administration of this program, are discussed.

1238

- Nord, M. 1952
WHAT THE LAW STATES. Indus. and Power, v. 62,
Jan. 1952: 71-73. DLC (TJ1.147, v. 62)

Legal aspects of air pollution are divided into two categories: (1) the common law of nuisance, and (2) legislative enactments. A public nuisance is one that affects the public at large, while a private nuisance is one that affects the individual or a limited number of individuals. The rights of property owners are discussed, and cases are cited of legal procedure employed in instances of complaints concerning smoke, fumes and gas, and dust.

1239

- Norling, B. S. 1953
FLY-ASH COLLECTION IN INDUSTRIAL EXPERIENCE.
Amer. Indus. Hyg. Assoc. Quart., v. 14, June 1953:
103-108, illus. DLC (RD963.A135, v. 14)

Some of the difficulties and costs involved in the installation of fly-ash collectors and a fly-ash disposal system for a large industrial plant surrounded by a residential area are discussed. It is pointed out that the cost of mechanical collectors is generally less than that for electrostatic precipitators; however, the latter are usually more efficient unless the electrical characteristics of the ash are not suitable. A combination of the 2 methods has often been used in fly-ash collection.

1240

- Norling, B. S. 1953
INDUSTRIAL EXPERIENCE IN FLY-ASH COLLECTION.
Air Repair, v. 2, Feb. 1953: 114-118.

DLC (TD883.A48, v. 2)
Fly-ash collectors were installed in a modern industrial plant whose 8 boilers average steaming rate was 750,000 lb/hr. The procedure and results of a complete evaluation of the needs and requirements of the plant are given. Mechanical collectors were selected and installed. Three different equipment arrangements were necessary for the 8 collectors. Diagrams of the installations and the results of the collector performance tests are included. The system of fly-ash disposal is described. The fly-ash is conveyed to the basement, passed through a multiple jet water ejector, and the re-

sulting slurry is pumped to a waste-disposal pond. The collector efficiency is based on a particle size analysis. The elutriation or sedimentation method and the sieving analysis are used as examples of test codes.

1241

- Nutting, A., 1953
and R. F. Logdon.
NEW AIR FILTER CODE. Heating, Piping and Air
Conditioning, v. 25, June 1953: 77-82, illus.
DLC (TH7201.H45, v. 25)

Objectives, principal features, and procedures of the Air Filter Institute's new test code for air cleaning devices covering panel or unit air filters, are discussed in detail. It is postulated that test procedures should be practical, direct and clearly specified; all the air should be filtered in testing. Specifications are given on the rate of dust, the duration of test performance, the feeding equipment, the aspirator system, and the feeding procedure. Efficiency runs should be made at uniform intervals not exceeding 1 hour. The "absolute filter" should be 99% efficient on test dust, and non-hygroscopic. The code specifies reporting procedures. Section I of the code specifies testing equipment, testing procedures and reporting methods of such nature that a basis for selection of air filters is provided. Selection of a test dust must be made to evaluate both efficiency and performance. Standardized air cleaner dust consists of 72% Arizona road dust (fine), 25% K-1 carbon black and 3% No. 7 cotton linters. The loading characteristics of a filter are also important, and depend more upon bulk density than on particle size of the dust.

1242

- 1957
OBSERVATIONS ABOUT MUNICIPAL INCINERATORS.
Amer. City, v. 72, Nov. 1957: 31, 189.
DLC (HT101.A5, v. 72)

The conclusions reached at an American Society of Civil Engineers Meeting on incinerator design are given. Location, size of site, storage pit design, and size of storage pit are considered. It is pointed out that a furnace providing a grate area able to release 300,000 Btu's/sq ft is considered to be adequate. In populated areas, scrubbers are necessary to minimize contamination by fly ash. Specifications generally require .85 of a pound of fly ash/1000 lb of effluent gases released, reduced to 12% carbon dioxide. Large incinerators complying with this specification could legally discharge many more lb of fly ash than smaller installations; however, it is agreed that the Ringelmann color test is the best available standard. Costwise, it is indicated that incinerator operation averages \$3 to \$4/ton of refuse burned.

1243

- O'Connor, T. C. 1955
SOME CHARACTERISTICS OF CONDENSATION NU-

CLEI STORED IN A LARGE VESSEL. (Paper presented at the First International Symposium on Condensation Nuclei at Dublin, Ire., 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 107-114. DGS

The coagulation coefficient, size, and charge distribution of condensation nuclei from room air, stored in a 4000-liter rubber balloon gasometer, were studied. The results indicate that the acquisition of water vapor contributes to the growth of stored nuclei. A preliminary trial was made to see if Junge's approximate rule that the number of particles in an aerosol varies inversely as the third power of their radius, also holds for Aitken nuclei. Further confirmation of the relationship between the percentage of stored nuclei electrically charged and their average radius was obtained. The measurements were carried out by means of the Pollak-Murphy photoelectric nuclei counter. A statistical analysis based on over a thousand comparisons of 2 identical models shows that the agreement of individual readings is better than 10% of nuclei concentration in 80% of all cases. Excessive differences have now been eliminated. (Author's abstract)

1244

1953

ODOR INTENSITY METER. Heating and Ventilating, v. 50, Aug. 1953: 113. DLC (TH7201.H4, v. 50)

Odor Instruments, Inc., announced the manufacture of a portable instrument for the measurement of the intensity of odors. The operation of the instrument is based on the principle of air dilution. Results are reproducible within 4-5%.

1245

1954

OIL SPRAY CONTROLS WASTE. Steel, v. 134, May 3, 1954: 128. DLC (TS300.1745, v. 134)

Cooperative action between the Disco Co. (a division of the Pittsburgh Consolidation Coal Co.) and the Gulf Oil Co. laboratories has improved control of airborne wastes. The Disco Co. manufactures a coked pellet which has excellent heating and clean-burning qualities. In the process of carbonization at low temperature, the mixture of fines and crushed coal is sprayed very finely with a special oil provided by the Gulf Co. laboratories. This oil acts as a coating for the powdered fines and coal, so that all dust is held on the surface and carbonized with the product. This procedure has reduced stack smokes to but a thin, white discharge, and has brought about savings in production cost.

1246

1955

O'Konski, C. T., and G. T. Doyle. LIGHT-SCATTERING STUDIES IN AEROSOLS WITH A NEW COUNTER-PHOTOMETER. *Analyt. Chem.*, v. 27, May 1955: 694-701. DLC (TP1.1615, v. 27)

The functions of a recording light-scattering photometer and electronic particle counter were combined in a single instrument, employing an improved right-angle optical system and a single electron multiplier phototube. Techniques were developed for standardization of the instrument by light scattered from filtered gases. As expected from theoretical considerations, the intensities from helium, hydrogen, nitrogen, carbon dioxide, sulfur dioxide, and methyl chloride increased approximately with the square of the mean molecular polarizabilities. The limit of sensitivity of the photometer was 3×10^{-11} g/l of a test aerosol 0.3 micron in diameter. Procedures were developed for producing uniform aerosols from uniform hydrocarbons. Pulse amplitudes of test aerosols 0.33, 0.5, and 1 micron in diameter obeyed the remarkably simple law of being proportional to the square of the particle diameters. The resolving power of the counter lies with a standard deviation of 8% in diameter, and the lower limit of sensitivity for single particles is a diameter of 0.3 micron. (Authors' abstract)

1247

O'Leary, F. M., and R. Porter.

1952

FIELD TESTING OF EXPERIMENTAL FIELD SAMPLING KIT DURING OPERATION. I. Army Chemical Corps, Fort Detrick, Md. September 1952. 28 p., illus. DLC-Sci

Four experimental BW Field Sampling Kits were assembled and tested in the laboratory at Fort Detrick. These kits were then evaluated under simulated tactical field conditions using simulants of *B subtilis* var. *niger* and *S. marcescens* at Fort McClellan, Alabama in July 1952. Samples of air and water were taken and surfaces were swabbed. Membrane Filters (MFs) were used for the collection and culturing of organisms. The samples were placed in an incubation vest, a component of the kit, and worn by the kit operator. Pigmentation of both agents used was obtained 14 to 16 hours after sampling. The trials showed the feasibility of the prototype sampling kit as an instrument for obtaining samples of BW aerosols and contaminated surfaces.

1248

Oliver, J.

1954

CATALYTIC OXIDATION OF AQUEOUS WASTES. *Chem. Eng. Progr.*, v. 50, Aug. 1954: 425-427. DLC (TP1.A6, v. 50)

A process has been developed and equipment installed for the catalytic destruction of aqueous waste materials from an ethylene glycol synthesis operation. The catalytic oxidation unit, which is reported to destroy 97% of the organic material in the waste streams, is described and illustrated. On the basis of experimental data, it was predicted that 99% destruction of the organics in the waste streams would be obtained with a feed temperature of 300°C, using a copper chromite catalyst. When the commercial unit was installed and adjusted, it was found that the cleanup of the wastes

was about 97%. The unconverted 3%, however, has created no air-pollution problem as the wastes are sufficiently vaporized and dispersed to be undetectable.

1249

- 1954
ONTARIO STUDIES SMOKE PREVENTION. Chem. and Eng. News, v. 32, Jan. 25, 1954: 320.
DLC (TP1.C35, v. 32)

Under the auspices of St. Clair River Research Group of Industries, and with the assistance of the Ontario Research Foundation at Toronto, Canada, and the Research Council of Ontario, half a dozen petrochemical industries in the Sarnia area are conducting an investigation on air pollution produced by their plants. Mobile testing equipment is being used. The first objective was the determination of the extent of pollution by smoke and gases. Throughout a period of more than a year, 1000 air samples have been analyzed.

1250

- 1954
THE ORIGIN OF "SMOG"; THE PROBLEM IN 1905. Smokeless Air, v. 25, Autumn 1954: 12-13.
DLC (TD884.S855, v. 25)

Although the word "smog" leaped into the headlines after the great London Smog of 1952, the headlines of the *Daily Express* for July 26, 1905 announce it as a "new name coined for London's fog compound." The word was said to have been coined by Dr. Harold Dex Voeux, the Smoke Abatement Society's first president. There is evidence that he used the word as early as 1904. The first use of the word in the United States of America is said to be in a report in the *New York Herald* of July 30, 1905, discussing the word in relation to air pollution in London.

1251

- Orr, C., and R. A. Martin. 1958
THERMAL PRECIPITATOR FOR CONTINUOUS AEROSOL SAMPLING. Rev. Sci. Instrum., v. 29, Feb. 1958: 129-130.
DLC (Q184.R5, v. 29)

A thermal precipitator is described for high collection efficiencies in testing air pollution particulates. The features of thermal precipitation are obtained by causing a strip of paper as a plastic film to move slowly over a cooled plate near which a heated plate is located. Particle-laden air enters at the periphery of the two plates, while the particle-free air escapes through a port provided in the center of the heated plate. The particles under the influences of the thermal field, are then driven to the white paper substrate, which can be examined microscopically without further preparation. Complete collection of particles resolvable with an electron microscope was attained in a 3 in. diam precipitating zone at a flow rate of 1 liter/min.

1252

- Ortgies, R. C. 1956
HOW DESIGN AND OPERATION INFLUENCE CUPOLA EMISSION. Modern Castings, v. 29, June 1956: 54-56, illus.
DLC (TS200.A7527, v. 29)

A study was made at a large midwestern foundry to determine the amount of material discharged from a cupola stack. Accurate sampling was maintained by studying the gas flow as considerable disturbance is encountered by entry of air through the charging door opening. The sampling kit consisted of a recently developed small diameter drycentrifugal-cyclone cell arrangement. In the first test, made with hot blast in operation and with melting at the rate of 13.2 tons/hr, a total of 89 lb of dust was emitted to the atmosphere/hr, of which 58 lb was caught by the sampler. Additional tests were made as 19, 23, 24, and 26 tons/hr melted. At 19 tons, the dust discharge increased considerably, whereas the increase of emissions recorded on the outlet pad was slight. Collection efficiency increased considerably. At the cupola's full rating of 23 to 26 tons, the total dust discharge again increased, with collector efficiency remaining constant. Using an 80-ft stack and 5 mph wind as a basis for calculation, the theoretical dust distribution in lb in relation to particle size in microns was projected. A series of tests was run using the cold blast principle at 18.3 tons/hr, but at this time it is impossible to offer a comparison between cold and hot blast cupolas. Some comments are made on the following factors which enter into the design of cupolas: bed height, charging door, stack height, igniters, material handling, and blower air volume.

1253

- [Oxy-Catalyst Mfg. Co., Inc., Wayne, Pa.] 1957
AIR POLLUTION. Chem. and Eng. News, v. 35, Dec. 9, 1957: 74.
DLC (TP1.C35, v. 35)

Announcement is made that the literature from Oxy-Catalyst, Inc., notes the "applications of catalytic oxidation to four difficult air pollution problems."

1254

- 1953
OXYCATS KILL WAX FUMES. Steel, v. 133, July 6, 1953: 153-154.
DLC (TS300.I745, v. 133)

To oxidize noxious wax fumes and particles escaping with the smoke, the Radio Corporation of America, Camden, N. J., has installed above the burn-off oven of its powdered metals division a bed of 204 Oxycats (oxidizing catalysts). These consist of two thick porcelain end plates with a porcelain spacer bar and 73 porcelain rods between them, which are coated with a film of aluminum-platinum alloy. A preheater combustion chamber has been added to raise oven exhaust to the 500°F temperature needed for the catalyst. As a result of this installation, the smoke problem and a serious fire hazard was eliminated.

1255

- 1955
OZONE COUNTER AIDS SMOG WAR. Oil and Gas Jour.,
v. 53, Apr. 18, 1955: 105. DLC (TN860.O4, v. 53)

The Los Angeles, Calif., Air Pollution Foundation has developed a photoelectric instrument for automatic, continuous measurement of ozone in the atmosphere. The instrument is made up of 2 parts — a projector and a receiver placed 300 ft apart. The ozone absorbs color in the ultraviolet wavelength, the receiver measuring this absorption. By mathematical calculation, the ozone content in the atmosphere can be determined.

1256

- Palm, P. E., 1956
J. M. McNerney, and T. Hatch.
RESPIRATORY DUST RETENTION IN SMALL ANI-
MALS. Arch. Indus. Health, v. 13, Apr. 1956: 355-
365, illus. DLC (RC963.A14, v. 13)

Experimental inhalation studies of dusts of various sizes were carried out with guinea pigs and monkeys, and the pulmonary dust retention characteristics of these 2 species relative to man were studied. Among the several findings it was noted that, as in man, the particle size with the greatest alveolar deposition was about 1 micron, and the percentage deposition about 50%.

1257

- Palmer, V. S. 1956
WIND PROFILE ANALYSIS. Army Chemical Corps,
Fort Detrick, Md. Interim Report No. 120, June
1956. 19 p. DLC-Sci

A new method developed by A. R. Crow of Fort Detrick, Md., for obtaining values of the stability parameter β from a plot of an approximation of the derivative of wind speed with respect to the logarithm of the height ($du/d(\ln z)$) versus u , was examined and evaluated [u being the wind speed, and $\ln z$ the natural logarithm of the height]. Although this method apparently proved to be adequate for the determination of β , its continued use appeared to be impracticable because of the large amount of computation and graphical work required. Four methods frequently used to determine the above parameters, are presented. An apparent diurnal variation of greater dimensions than is apparent in several other methods causes some concern. The Longley method for determining β is superior to that of Crow, in that similar results may be obtained with less computation and less chance of arithmetic error: further investigation of the Longley method is suggested. (Author's abstract and summary, modified)

1258

- Pantaleoni, R. 1953
ODORS AND FRAGRANCES. Chem. and Eng. News, v.
31, Apr. 27, 1953: 1730-1734. DLC (TP1.C35, v. 31)

A summary of the use of deodorants is presented, without any specific mentioning of chemicals pertinent to air pollution. Large industrial plants, such as paper mills, are now using deodorants to abate odors. Especially designed deodorants with high odor intensity and chemical stability are required to make a large scale deodorization commercially feasible.

1259

- Pantůček, M. 1952
DETERMINATION OF FORMALDEHYDE IN AIR.
(Paper presented at the Congress of Practical Polarography, and arranged by the Central Polarographic Institute of Prague, Bratislava, Czechoslovakia, Feb. 18 and 19, 1952). [Abstract]. Analyt. Chem., v. 24, May 1952: 917. DLC (TP1.J615, v. 24)

Air is bubbled through the solution of hydroquinone in calcium hydroxide, where a condensation product is formed which gives a wave 200 Mv more positive than that of formaldehyde. Oxygen is removed by hydroquinone. (Author's abstract)

1260

- Parker, A. 1957
THE REMOVAL OF SULPHUR DIOXIDE FROM FLUE
GASES. Smokeless Air, v. 28, Winter 1957: 101-102,
106. DLC (TD884.S855, v. 28)

The process of removing oxides of sulfur from flue gases by scrubbing with solutions containing ammonia and recovering the sulfur as marketable ammonium sulfate is discussed. It is concluded that an efficiency of higher than 90% cannot be obtained from a single-stage scrubbing with a solution containing 400 g of ammonium salts per liter. Experiments of scrubbing in a two-stage process with a strong solution and, thereafter, with a weaker solution, ammonia being added in both stages, gave efficiencies of from 95 to 98% sulfur dioxide removal from flue gases containing 0.06% sulfur dioxide by volume.

1261

- PARTICLE COUNTER AND SIZER (AUTOMATIC). Instrum.
Rev., v. 4, May 1957: 330. DLC

"The automatic particle counter and sizer is manufactured for counting and sizing microscopic material on a standard microscope slide or in a liquid counting chamber. It employs the wide track scanning method across a slit variable in width and breadth from 0 to 10 mm. Materials such as diamond dust, coal dust, spray droplets, and chemical powders in the size range 1.0 to 200 microns are readily counted and sized. An area 10 by 5 mm is scanned in 55 sec. The instrument, mounted in a cabinet, is available with 1, 3, or 5 scaler units, each unit recording from 1 to 99,999." (Quoted in full)

1262

- 1957
[PARTICLE RESOLVER]. Science, v. 125, Jan. 18, 1957: 130. DLC (Q1.S35, v. 125)

A particle resolver made by Cinema-Television, Ltd., of London, utilizes flying-spot scanning to convert a 2-dimensional distribution of density into a varying voltage/time relationship which in turn is used to produce an 8X8 inch image of a microscopic subject on a picture tube. Magnification is variable from 200 to 8000 diameters; resolution is 0.1 micron. The instrument can also be used to count automatically the number of particles within the objective; a sizing unit permits selection over a range from 0.6 to 160 microns in 60 increments.

1263

- 1953
PARTICLE SIZE DISTRIBUTION ANALYZER. Analyst. Chem., v. 25, Aug. 1953: 24A. DLC (TP1.I615, v. 25)

"Announcement is made of a newly designed instrument which quickly and accurately determines the particle size distribution of powdered materials. The instrument has just been placed in production by the Sharples Corp. Research Laboratories. Its use enables a single person to determine the particle size distribution of billions of particles with an accuracy of $\pm 3\%$ in about an hr, a task which formerly would have taken several persons several months to complete. The Micromerograph utilizes a technique in which powder particles are dispersed in air and are allowed to settle under the action of gravity through a tube onto a servo-electronic balance. The balance (sensitivity, 0.1 milligram; response time, 5 to 10 millisecon) yields a continuous record of the weight of powder settled, plotted against time. Through the application of Stokes' law, a particle size distribution curve is obtained. The average sample is 100 milligrams, but the instrument can use samples from 25 to 700 milligrams. This relatively large sample eliminates possible significant statistical errors. The instrument is housed in one complete, integrated unit mounted on a wall or column. It requires floor space of 13 X 23 in. and a height of 8.5 ft. A cylinder of nitrogen is required; this compressed gas is used to inject the powder sample into the sedimentation tube through the deagglomerator." (Quoted in part)

1264

- 1952
[A PATENT AUTOMATIC GAS WASHER]. Chem. Age, v. 66, Jan. 19, 1952: 392. DLC (TP1.C33, v. 66)

Announcement is made of an automatic gas washer, produced by the Kestner Evaporator and Engineering Company, Ltd., the principal component of which is a Venturi tube. An impeller at the top draws up gas and scrubbing liquid together, mixes them thoroughly, and recirculates them if necessary. The advantages claimed for the washer are its compactness, the fact that the impeller is the only moving part and the only one needing an energy source, the continuity of operation, and the low power and running costs.

1265

- Patno, M. E. 1954
GEOGRAPHIC STUDY OF CANCER PREVALENCE WITHIN AN URBAN POPULATION. Publ. Health Rep., v. 69, Aug. 1954: 705-715. DLC (RA11.B17, v. 69)

In this statistical study of the differences in the distribution of cancer morbidity within 16 homogeneous areas in Pittsburgh, Pa., during 1947, there were 2 distinct areas where the white population experienced a high prevalence of cancer. The "downtown" and "hill" region (area 1) with the lowest economic status, the highest number of foreign-born individuals, and the highest proportion of nonwhite population, led all the areas in cancer prevalence and mortality among white males. Both the white and nonwhite females of the area experienced high prevalence and mortality; nonwhite males fared better than those residing outside the area. Among the white males prevalence rates were especially high for cancer of the skin and of the respiratory tract, suggesting the possibility of air pollution as a major, or contributing, cause. However, neither the white women nor the nonwhite men in this area experienced any increase in respiratory cancer. Evidence available on air pollution in Pittsburgh does not suggest that the atmospheric environment of area 1 might be less favorable than that of other areas. The Squirrel Hill section (area 2) led all others in cancer prevalence and mortality among white women and followed area 1 only in prevalence among white men. This is an area of high economic status. The 2 areas with lowest prevalence rates resembled area 1 in being of low economic status, but had fewer nonwhite and foreign-born people. Part of one of these areas is reported to be at a site of heavy air pollution.

1266

- Patton, H. W., J. S. Lewis, and W. I. Kaye. 1955
SEPARATION AND ANALYSIS OF GASES AND VOLATILE LIQUIDS BY GAS CHROMATOGRAPHY. (Paper presented before the Division of Petroleum Chemistry at the 126th Meeting of the American Chemical Society, New York, N. Y.). Analyst. Chem., v. 27, Feb. 1955: 170-174, illus. DLC (TP1.I615, v. 27)

Gas chromatographic techniques were used to study the potentialities of selective absorption and partition methods for the separation and analysis of gases and volatile liquids. Methods involving elution by hydrogen, nitrogen, or carbon dioxide from columns containing charcoal, silica gel, or alumina provided excellent separation of hydrocarbons and other nonpolar materials. Gas chromatographic elution is simple, accurate, and very effective for the identification and determination of the components of many gaseous and liquid mixtures, particularly of hydrocarbons. (Authors' abstract)

1267

- Peace, T. R. 1952
THE EFFECT OF ATMOSPHERIC POLLUTION ON
FOREST TREES IN GREAT BRITAIN. *Smokeless Air*,
v. 23, Autumn 1952: 12-16.

DLC (TD884.S855, v. 23)

Two main reasons are cited for the lack of any large amount of accurate information on the damage to trees from air pollution: (1) the kind of fumes or smoke causing damage varies from place to place, so that results from one area often do not apply to another; and (2) the smoke and fumes are often not the only causes of injury since such conditions as drought or blight can be of either primary or secondary importance in a given area. The first reason would account for the rather startling discrepancies that occur between lists of trees arranged in order of susceptibility by different authors. Often also, when extensive studies were made in connection with compensation for damages, the installations involved were new ones in an isolated area, and only a single pollutant was involved. Damage to trees is primarily to the foliage; in conifers particularly, repeated injury can result in dieback of twigs and eventually in the death of the tree. Retarding of growth becomes an economic factor since it increases the time necessary for trees to reach a marketable age. Injury to broadleaved trees usually takes the form of a discoloration of those parts of the leaf furthest from the leaf veins, at the edge of the leaf. Damage, in general, depends on the amount of permanent damage done to the health and rate of growth of the tree and will depend mainly on how early in the season the damaged leaves fall and whether the injury had affected all the leaves. The majority of conifers are, in general, much more susceptible than the majority of hardwoods. Sycamore, elm, and poplar show considerable resistance, while ash and beech are rather susceptible. Corsican pine and Japanese larch show some resistance, while European larch, Douglas fir, the spruces, and in particular the Silver firs and Scotch pine are susceptible. There is really no evidence available to show how much damage is done to forest trees by air pollution. An investigation of the injury to conifers in two forest areas in South Wales, resulted in the finding that the effect of the industrial fumes was largely in the area near the concentrated source of pollution and that, even though there was a considerable soot deposit, there was no appreciable damage from air pollution over the area as a whole. The result of the investigation of the Trail Smelter incident, has become something of a classic in the literature of fume damage. Most of the claims were based on damage to trees and farm crops with the area of damage mostly in the United States, and the smelter located in Canada.

1268

- Peart, A. F. W., and G. H. Josie. 1953
PLANNING A STUDY TO DETERMINE THE EFFECTS
OF AIR POLLUTION ON HEALTH. *Arch. Indus. Hyg.
and Occupat. Med.*, v. 7, Apr. 1953: 326-338, illus.

DLC (RC963.A14, v. 7)

Various aspects of the air pollution problem are discussed, especially that of the need for a reliable health index which can be associated with air pollution. There is included a review of the Detroit River air pollution study giving some of the environmental findings, as well as plans and procedures, with emphasis on the health aspects of the investigation.

1269

- Peters, M. S. 1955
STOP POLLUTION BY NITROGEN OXIDES. *Chem.
Eng.*, v. 62, May 1955: 197-200, illus.

DLC (TN1.M45, v. 62)

In order to avoid air pollution of an area, and for economic reasons, the nitrogen oxide content of stack gases from industrial plants should be reduced to less than 0.2 volume %. Effective methods for removing nitrogen oxides from dilute gases are described using the following equipment: spray tower, packed tower, silica gel adsorber, fritted bubbler, or bubblecap tower. A chart of the results indicates the removal efficiency in % according to the volume % ($\text{NO}_2 + \text{N}_2\text{O}_4$) entering the unit. In each case the absorbent was water (or silica gel); diluent, air; pressure, 1 atmosphere; and temperature, 25°C. At low concentrations, the bubble-cap tower is reported to give good removal efficiency.

1270

- Phair, J. J. 1956
THE EPIDEMIOLOGY OF AIR POLLUTION. In *Air
Pollution Handbook*. New York, McGraw-Hill Book
Co., Inc., 1956, Section 7, p. 7-1 to 7-14.

DLC (TD885.M35)

The possible hazards from pollution of the atmosphere of industrial cities are discussed including industrial toxicology, unusual or accidental exposures, and excess morbidity and mortality rates. In considering future studies of air pollution control, the basic concept of the proper epidemiological method is presented.

1271

- PHILADELPHIA WILL REGULATE ODORS TO SAVE
SLIGHTED AREAS. *Air Repair*, v. 1, May 1952: 45.

1952

DLC

The Franklin Institute, Philadelphia, Pa., has isolated the chemical components of odors produced by specific industries, and has developed methods for measuring them so that now they are subject to city regulations. Equipment used to collect and concentrate the odor-causing chemicals includes a specially constructed liquid-nitrogen condenser which cools the odorous gases to temperatures of 300° below freezing. The resulting liquid is analyzed in an infrared spectrometer which indicates the chemical compounds present. A simple tester has been designed to identify certain malodorous compounds in the field.

1272

- Phillips, P. H. 1956
THE EFFECTS OF AIR POLLUTION ON FARM ANIMALS. In Air Pollution Handbook, New York, McGraw-Hill Book Co., Inc., 1956, Section 8, p. 8-1 to 8-12.
 DLC (TD883.M35)

The effects of arsenic, fluorine, and lead on livestock are discussed. The symptoms of acute poisoning, chronic poisoning, and the tolerance of farm animals to these chemicals is presented. Tables are included.

1273

- 1952
PHOTOELECTRIC EYE CONTROLS COMBUSTION. Indus. and Power, v. 62, Jan. 1952: 94, illus.
 DLC (TJ1.I47, v. 62)

This unit measures the visual quality of the products of combustion. When smoke is observed the photoelectric eye operates to control oxygen content of hydrocarbon fuels burned in suspension. In some plants, the unit functions as both an air flow regulator and a fuel-air ratio control; in some other cases it operates only as a fuel-air ratio control, serving as an override, vernier, or corrector to perfect the setting made by other less exact combustion control devices, which had previously been installed. The most efficient point to hold carbon dioxide content in flue gases is between 11.5 and 14%.

1274

- 1952
PHOTOELECTRIC SMOKE INDICATOR. Heating, Piping, and Air Conditioning, v. 24, Dec. 1952: 176.
 DLC (TH7201.H45, v. 24)

An announcement is made of the manufacture of the "Fireye Photoelectric Smoke Indicator, Series FE." The instrument indicates the density of smoke that may be passing through a stack and can also be used to signal when the smoke density exceeds a predetermined value. The smoke density is measured in terms of per cent depression in intensity of a light beam.

1275

- Pitts, J. N., Jr., 1952
 D. D. DeFord, and G. W. Recktenwald.
MANOMETRIC GAS ANALYSIS APPARATUS. Analyst. Chem., v. 24, Oct. 1952: 1566-1568, illus.
 DLC (TP1.I615, v. 24)

The development of an inexpensive, accurate, and versatile gas analysis apparatus which can be operated with a minimum of training and effort is described. The apparatus requires only 2 to 6 ml of sample, and employs "bead" reagents for selective removal of the various components in the sample. Expensive burettes are eliminated by measurement of pressure changes rather than volume changes. The precision and accuracy are of the order of $\pm 0.2\%$ absolute for oxygen and

- c carbon dioxide. Despite its simplicity, the apparatus promises to be very useful for accurate analyses of a wide variety of gaseous samples. (Authors' abstract in part)

1276

- 1955
PLAN TO STOP AIR POLLUTION. Jour. Amer. Med. Assoc., v. 157, Mar. 19, 1955: 1039.
 DLC (R15.A48, v. 157)

The recommendations proposed by the Beaver Committee (Gt. Brit.) to reduce smoke by 80% in heavily populated areas are presented. They include: (1) enactment of a new Clean Air Act to prohibit dark smoke from chimneys; (2) creation of a Clean Air Council to coordinate the fight against pollution; (3) authorization of local officials to enforce smokeless zone regulations; (4) reduction of the household use of bituminous coal; (5) official approval of all domestic heating appliances; (6) elimination of the use of coal-fired locomotives for switching in populated areas after 1960; (7) enforcement of the law against avoidable smoke from motor vehicles; (8) discontinuation of the use of ineffective types of dust-arresting and grit-arresting equipment; and (9) extension of the Government's loan program for approved fuel-saving schemes.

1277

- 1957
PLANTS AFFECTED BY SMOKE. Smokeless Air, v. 28, Autumn 1957: 18.
 DLC (TD884.S855, v. 28)

A definite effect on vegetation, due to polluted air blown from the city by a prevailing south-west wind, can be noted in areas north and east of London. Mosses growing on trees are most seriously injured. In Paris in one year nearly 1,500 trees died with the main cause attributed to air pollution by fumes and dust.

1278

- 1957
POINT OR PARTICLE COUNTER. Instrum. Rev., v. 4, Feb. 1957: 73.
 DLC

"In this instrument, electric impulses are transmitted by the operation of the mechanical stage to the counter unit, which continues to operate the selected counter until the impulses are switched to another counter by 1 of 8 push buttons, each of which is mutually exclusive. This mode of operation greatly enhances speed at which an analysis can be made, as the selector buttons need only be operated on passing the crystal boundaries. The stage can be traversed to give about 12 counts/sec. The mechanical stage is attachable to any Cooke polarizing microscope, transmits alternately from both directions at either 10 or 20 counts/mm, and allows counting over the full area of a 3- by 1-in. slide. The counting unit has 8 4-figure counters, and a totalizer and a switch is provided to isolate stage transmissions, thus allowing the unit to be used for particle counting or blood cell analysis." (Quoted in full)

1279

- Policard, A., and A. Collet. 1952
DEPOSITION OF SILICEOUS DUST IN THE LUNGS OF THE INHABITANTS OF THE SAHARAN REGIONS. Arch. Indus. Hyg. and Occupat. Med., v. 5, June 1952: 527-534, illus. DLC (RC963.A14, v. 5)

Histopathological examinations of lung tissue from 4 native mounted policemen, who had lived continuously in the sandy desert regions of North Africa and who had died from unrelated causes, showed the presence of deposits of silica particles lodged in the periarterial and peribronchial sheaths of the lungs. Although the sands of the area are known to be almost pure silica, lesions of a silicotic type were not observed. Several reasons for this lack of reaction are presented, including the harmlessness from the "old" character of the silica dust, or the presence of large quantities of ferric oxide in the dusts acting protectively. The nontoxic character of these fine dusts, from which particles of less than 2 to 3 microns have been isolated, was demonstrated also by the peritoneal test of Miller and Sayers.

1280

- Pollak, C. 1954
COST OF FIGHTING SMOG. Petroleum Processing, v. 9, Oct. 1954: 1567-1569. DLC (TD690.A1P37, v. 9)

Smog abatement has cost the petroleum industry in Los Angeles County (Calif.) approximately \$2 million in research and \$23 million in equipment. Collective answers from the county's 8 largest refineries are given to questions asked in a survey on abatement expenditures. Questions and answers are grouped under 4 main topics: (1) research expenditures; (2) SO₂ corrective equipment; (3) hydrocarbon-vapor control; and (4) other refinery emissions. A report of the Stanford Research Institute (Calif.) indicates that 81% of the hydrocarbons emitted into the atmosphere come from automobile exhausts.

1281

- Pollak, L. W., and T. Murphy. 1953
COMPARISON OF PHOTOELECTRIC NUCLEI COUNTERS. Geofisica pura e applicata (Milano), v. 25, May-Aug. 1953: 44-60, illus. DLC (QC801.G37, v. 25)

Nuclei counts were made and compared using 2 each of 3 different photoelectric nuclei counters. Comparisons were made using first the regular laboratory air and then laboratory air drawn through an opening in the window into a mobile laboratory standing outside. Many of the results were obtained using artificially produced nuclei which were stored in a radiosonde balloon inflated to a diameter of 6 ft or more. The results of several thousand readings show that no 2 counters will record the same concentration of nuclei in

samples taken simultaneously from the same source. Each counter shows random fluctuations of short period, $\pm 3\%$ of the concentration, with superimposed unpredictable variations of longer period. The difference in readings between any 2 counters depends on the concentration, the type, and the relative amounts of the charged and uncharged nuclei in a sample. These differences, which seldom exceed $\pm 20\%$ of the concentration, are rather constant for several hours and even days. This feature enables allowances to be made for the differences, and a routine of observations is suggested which has been successfully employed in the laboratory and in the field. Each counter exhibits, when operated continuously, a "drift" which consists of a tendency to indicate that the concentration of nuclei increases when a constant value or a slight decrease is expected theoretically. A study of the statistical analysis of the individual readings, and a detailed investigation of the components of each counter have not lead to an elucidation and elimination of the differences between counters.

1282

- Pollak, L. W., and T. C. O'Connor. 1955
DECAY OF AEROSOLS IN SMALL AND VERY SMALL VESSELS AND A STATIC METHOD FOR DETERMINING THE SIZE OF CONDENSATION NUCLEI. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). Geofisica pura e applicata (Milano), v. 31, May-Aug. 1955: 66-79. DGS

A static method for determining the size and mass of condensation nuclei stored in a closed vessel is considered, using as a basis decreasing concentration and the 2 coefficients γ and λ of the decay law. The theory involved is discussed. It was found that the coefficient of the linear term in the decay law is not a constant but depends on time. Using the static method in investigating atmospheric aerosols, it is possible to determine: (1) from 2 measurements of concentration, the size of nuclei; (2) from 3 measurements of concentration, the size, density, and mass of nuclei; and (3) a sequence of instantaneous values of size, density, and mass, in contradistinction to the dynamic method which provides only averages covering 10- to 30-min periods. It is pointed out that agreement between the diffusion coefficients (size of nuclei) obtained by the static and the dynamic method is good.

1283

- Pollak, L. W., and others. 1955
ON THE DETERMINATION OF THE DIFFUSION COEFFICIENT OF CONDENSATION NUCLEI USING THE STATIC AND DYNAMIC METHODS. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). Geofisica pura e applicata (Milano), v. 34, May-Aug. 1956: 177-195. DGS

In a previous publication (Pollak, L. W. and T. C. O'Connor, *Geofis. pura e appl.*, v. 31, May-Aug. 1955: 66-79), the problem of determining the diffusion coefficient, and consequently the size of condensation nuclei from their rate of disappearance in a closed vessel, was investigated. The vessel used was a tall cylinder, and the loss of nuclei was assumed to be caused entirely by sedimentation and diffusion to the walls of the vessel, and not by coagulation. This method of measuring the diffusion coefficient of nuclei is referred to as the "static" method in contrast to the "dynamic" method in which the loss of nuclei from air passing through a thin rectangular channel is determined. A detailed comparison between the values of the diffusion coefficient of condensation nuclei obtained by each of the methods was carried out.

1284

Pollak, L. W., and T. C. O'Connor. 1955
A PHOTOELECTRIC CONDENSATION NUCLEUS COUNTER OF HIGH PRECISION. *Geofisica pura e applicata* (Milano), v. 32, Sept.-Dec. 1955: 139-146, illus. DGS

A new model of the direct beam photoelectric condensation nuclei counter and its properties are described. The reduction of the fogtube diameter results in the complete elimination of all uncertainties in the measurement of the light intensity after the fog is formed by adiabatic expansion. Individual measurements with 2 identical counters of this design which incorporate all previous improvements, agree to better than 5% in 70% of all cases, their average absolute difference being 2%. Deviations of more than 1 division of meter readings (or 10% of concentration) were not observed. This agreement is maintained over long periods. A calibration curve of the latest model of the photoelectric nuclei counter is given. (Authors' abstract)

1285

1958
POLLUTION CONTROL FOR WIRE COATING OVENS THROUGH CATALYTIC OXIDATION. *Indus. Heating*, v. 25, Feb. 1958: 344, 346, illus. DLC (TH7201.15, v. 25)

A unit for eliminating fumes and property-damaging varnish vapors and other objectionable effluents in the exhaust gases of wire coating ovens is described. By catalytic oxidation the system can dispose of up to 5 1/2 gal. of solvent per hr. The minimum operating temperature of the catalyst is 500°F. Once combustion has started it will sustain itself without the preheater, provided the outlet temperature of the catalyst chamber is above 800°F. The catalyst bed is composed of 51 Oxycats, which consist of catalyst-coated porcelain rods.

1286

1954
POLLUTION OF AIR AND WATER: ITS STUDY AND PREVENTION. *Chem. Age*, v. 70, Mar. 20, 1954: 677-678. DLC (TP1.C33, v. 70)

A review of America's improvements in air pollution control is presented, according to information taken from the "Chemical News" [no date or volume stated]. America's chemical industry is making significant progress and has taken the lead in the abatement of air and water pollution.

1287

1955
POLLUTION PROBLEMS GET AIRING. *Chem. and Eng. News*, v. 33, May 9, 1955: 1970-1972. DLC (TP1.C35, v. 33)

Recent Senate hearings on air and water pollution provided a sounding board for the Government, the public, and industry. All groups agreed that additional legislation on air and water pollution was necessary, as existing bills (S. 928 and S. 890) were inadequate. H. L. Jacobs of DuPont, spokesman for the Manufacturing Chemists' Association, argued that power to control pollution should continue to rest with the states, since many local situations are involved, of which the Surgeon General cannot be fully cognizant. W. Penfield of Penn Salt, testifying also for the M. C. A., believed that national legislation for air pollution is somewhat premature, because this problem is not completely understood, and regulations cannot be laid down with certainty. The bill should be modified in various parts to give states flexibility in handling specific problems; the wording of the passage "authorizing the Surgeon General to encourage enactment of uniform state laws relating to air pollution" should be changed to mean "encourage the exchange of information among states." The wording should dispel the idea that the Government would subsidize industry for the construction of air pollution equipment. The sections relating to the establishment of an air pollution advisory control board should be eliminated. The U.S. Public Health Service seemed to agree that certain wordings in the bill were inappropriate. It believed that a general type of legislation could be submitted to each state; the states could then adapt this legislation by adding further specific additions.

1288

Poppoff, I. G. 1954
DUST SAMPLING BY THERMAL PRECIPITATION. *Amer. Indus. Hyg. Assoc. Quart.*, v. 15, June 1954: 145-150. DLC (RD963.A135, v. 15)

"The theory of thermal precipitation is summarized, and its applicability to the operation of aerosol collectors is considered. The characteristics of thermal precipitators are discussed. Results from limited investigations of the operating characteristics of one type of thermal precipitator are given." The technique of thermal precipitation provides an ideal sample for electron-microscope analysis, collecting small dust

particles without agglomeration or any size discrimination, at least below 10 microns; it allows precipitation directly and without damage onto Formvar-covered electron-microscope specimen screens.

1289

1957
PORTABLE GAS ESTIMATOR. Instrum. Rev., v. 4,
May 1957: 334. DLC

"This instrument was designed by Imperial Chemical Industries, Ltd. to estimate the content of CO, CO₂, H₂S, and NH₃ in gas mixtures over the range of 5 to 100 ppm. The gas sample, after passing through a scrubber at a known rate, enters an electrolytic cell, where the change in conductivity due to the presence of the contaminating gas is detected, and its value used to estimate the amount in ppm with an accuracy of $\pm 2\%$. (Quoted in full)

1290

[Powell, J. E.] 1956
MR. POWELL ON THE CLEAN AIR ACT. Smokeless
Air, v. 26, Winter 1956: 92-96.
DLC (TD884.S855, v. 26)

Mr. Powell, Parliamentary Secretary to the Minister of Housing and Local Government, addressed the Southport Conference on some of the regulations and procedures which are to be put into effect soon in order to activate the provisions of the Clean Air Act. He stated that the Minister intended to fix a day before the end of the yr for the commencement of the provisions relating to smoke control areas (Sections 11-15), new furnaces (Section 3), the height of chimneys (Section 10), and various other provisions of the Act which will be required in connection with those Sections. Regulations are in preparation concerning authorized fuels for use in smoke control areas; appliances exempted from Section 11; the use of smoke density meters; the measurement of grit and dust emissions from furnaces; and the creating of smoke control areas. The 7-yr "period of grace" should be understood as not allowing general exemption from the prohibition of dark smoke but as affording only a limited defense -- limited in scope and limited in time. To establish the defense, it will be necessary to prove that the emission of dark smoke was due to the nature of the building or its equipment and not to lack of maintenance or improper use, and that the necessary alterations or new equipment could not have been completed at the time the violation occurred.

1291

1958
PRECIPITATORS CLEAN GAS FROM OXYGEN. Blast
Furnace and Steel Plant, v. 46, Feb. 1958: 216-217.
DLC (TN1.B7, v. 46)

The Cottrell electrostatic precipitator described - supplied by Research-Cottrell, Inc., Bound Brook, N. J. - is the first commercial application of an electrostatic precipitator to clean exhaust gases from an oxy-

gen converter. Entrained dust consists mainly of iron oxides. The gases generated at the converter are burned with excess air and then cooled with water sprays to between 350° to 550°F before entering the precipitator, which cleans 238,000 cu ft/min with an efficiency of 99.5%. The gases evolved consist of 12% carbon dioxide, 12% oxygen, 67% hydrogen, and 9% water minimum after cooling.

1292

1953
PRECIPITATORS PASS SMOKE CONTROL TESTS. Steel,
v. 133, Aug. 31, 1953: 78-80, illus.
DLC (TS300.I745, v. 133)

The Torrance Works of the Columbia-Geneva Steel Division of the U. S. Steel Corporation applied Cottrell electrostatic precipitators for open-hearth gas cleaning, designed by the Research Corporation, N. Y., to prevent air pollution. The results obtained exceeded Los Angeles County control requirements-and-guarantee provisions. There are 4 open-hearth furnaces producing 58 tons of steel from 138,000 lbs processing material. Dust discharge was reduced to 2.02 lbs an hr (from an average of 75 to a maximum of 245 lbs an hr); precipitator efficiency averaging 98.1%. The precipitators are of the dry-plate, horizontal-flow type, with two interconnected gas cleaning sections. The incoming gas flows through a duct arrangement, made up of successive banks of collectorplate electrodes of high-tension discharge (47-67 kv charge). Electromagnetic rapping equipment provides an automatic method of cleaning the collecting electrode plates and is monitored by remote control.

1293

Princi, F. 1954
PUBLIC HEALTH ASPECTS OF ATMOSPHERIC
POLLUTION. Amer. Jour. Publ. Health, v. 44, Feb.
1954: 206-210. DLC (RA421.A41, v. 44)

Recent episodes involving lethal effects of atmospheric pollution such as the Poza Rica (1950) and Donora (1948) incidents, are reviewed. The effects of the more common atmospheric pollutants upon the general health of the population of urban or industrial centers have never been demonstrated in terms of authenticated chronic disease processes. There is a need for knowledge of the effects of contaminants on the individual organism involving measurements of the individual's capacity to handle various stress situations.

1294

Pring, R. T. 1952
BAG FILTRATION OF AEROSOLS. Heating and Ventila-
ting, v. 49, Dec. 1952: 97-99.
DLC (TH7201.H4, v. 49)

The problem of applying cloth filters to fume-producing operations is largely one of cooling the gases to prevent heat damage to filter fabrics. Seven examples of

hot gas treatment equipment are cited. These include filtration of carbon black and fumes from copper, brass, and iron melting, and from secondary lead smelting. In most cases the filter bags were made of Orlon.

1295

1957
PROBING SMOG. Eng. News-Rec., v. 159, Oct. 24, 1957: 61-62. DLC (TA1.E6, v. 159)

The chemical composition of smog is being studied at the University of California with the aid of fractional sublimation methods. The samples are collected, weighed, and put into a vacuum sublimation tube. The tube is heated at one end resulting in a temperature gradient extending from one end of the tube to the other. This results in a separation of the contents which are then recovered and quantitatively analyzed.

1296

1956
Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
PROCEEDINGS OF A SEMINAR ON AIR POLLUTION PROBLEMS HELD AT ROBERT A. TAFT SANITARY ENGINEERING CENTER, CINCINNATI, OHIO, SEPTEMBER 20-21, 1955. U. S. Department of Health, Education, and Welfare, Public Health Service, 1956. 139 p. DPH

The objective of the Seminar was to provide an opportunity, particularly for representatives of State and Federal agencies, to discuss common problems relating to the organization and administration of air pollution activities. In his remarks during a general introduction to the problems, the Chairman of the Seminar, H. G. Hanson, Director of the Robert A. Taft Engineering Center, noted that it was the first opportunity since the passage of the Air Pollution Act for representatives to meet for an exchange of views and problems and for the Center to receive suggestions regarding the way in which it can best carry out the responsibilities Congress has assigned to it. The records of the Seminar are to be made available to participants and others interested in the form of proceedings. The papers given at the Seminar are listed under the headings of: General Introduction to Problems; Local Air Pollution Control Problems; State Air Pollution Control Problems; and Planning Considerations. Panel discussions were held on the subjects of personnel needs, equipment and laboratory needs, and budgetary needs. The individual papers have been abstracted separately, and can be found in this volume under the following abstract numbers: 801, 802, 818, 843, 847, 855, 873, 947, 962, 990, 1012, 1024, 1109, 1113, 1146, 1156, 1370, 1380, 1428, and 1438.

1297

1957
Parcell, P. R., and T. H. Williams.
THE EXTRACTION OF SULFUR FROM COKE-OVEN GAS AND THE MANUFACTURE OF SULFURIC ACID.

(Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 127. DLC (TD684.S855, v. 28)

This paper describes the plant installed at the Corby Coke-ovens for the desulfurization of coke-oven gas by the Collin ammonia process and the production of sulfuric acid from the recovered hydrogen sulfite by the Chemiebau wet-contact, sulfuric acid process. Operation of the plant is discussed and modifications which have been incorporated are described. Finally, recent developments of the process are briefly reviewed. (Quoted in full)

1298

1953
Quass, F. W.
ATMOSPHERIC POLLUTION AND SMOKE CONTROL IN THE UNION OF SOUTH AFRICA. Air Repair, v. 2, May 1953: 125-127. DLC (TD863.A48, v. 2)

The major source of air pollution in the Union of South Africa is traceable mainly to residential suburbs of the cities. Obsolete combustion apparatus and coal with a high volatile matter content are the causes of this pollution. The atmospheric pollution problem at Pretoria, Union of South Africa, is discussed and compared to that at Los Angeles, Calif.

1299

1955
Randall, D. L., and A. B. J. Clark.
A RADIO-COMMAND-CONTROL PUFFER FOR STUDYING AIRFLOW. Bull. Amer. Meteorol. Soc., v. 36, May 1955: 224-227, illus. DLC (QC851.A6, v. 36)

A system is described with which airflow in the lower 1000 or 2000 ft of the atmosphere can be studied by the use of a radio-command-control smoke puffer. Several applications of this system are proposed in connection with balloon-sounding techniques. (Authors' abstract)

1300

1958
Ranz, W. E.
MIST AND DUST COLLECTION EQUIPMENT. Indus. Wastes, v. 3, Jan.-Feb. 1958: 1-6, illus. DLC

A classification and discussion of mist and dust collecting equipment according to the mechanism of collection is presented. Simple settling chambers can remove particles with sizes above about 40 microns. Chambers with multilayered collection trays can remove particles down to sizes of about 10 microns. The bag filter, the only important form of direct filtration, can filter any dust which forms a relatively porous dust layer such as carbon black, and fly ash. In inertial separators the efficiency is increased by increased particle size, gas velocity, and particle density. The electrostatic precipitator is the only general-purpose device capable of removing micron and submicron particles. Examples

of these four classifications are given, their principle and application are discussed.

1301

- Ray, F. E. 1955
PLASTIC CHAMBERS FOR QUANTITATIVE STUDIES OF BIOLOGICAL AEROSOLS. Army Chemical Corps, Fort Detrick, Md. Interim Report No. 83, Nov. 1955. 13 p., illus. DLC-Sci

Aerosol standardization studies were conducted in aerosol units operated by the Chemical Corps at Fort Detrick, Md. The physical equipment included four cylindrical chambers, a Hartmann fixture and miniature fixture for dissemination, an all-glass impinger for aerosol sampling, a variable speed and variable-pitch fan for stirring, and a purging system for removing contaminated air. The adequacy of the air purging system was determined by a typical purging study with Sm and Bg organisms [*Serratia marcescens* and *Bacillus globigii*]. The number of viable organisms remaining after purging was insignificant. It was found that the precision of the simulant capsules compared favorably with that of the larger aerosol units. Although the calibration studies presented are not all-inclusive and all phases of these studies are not applicable to various types of aerosol units, there appears to be little doubt that, if satisfactory aerosol research is to be accomplished in a test unit, a comprehensive series of calibration tests must be carried out. The presentation of these data also illustrates the application of statistical design and analysis routinely employed in these aerosol tests. It seems evident that the simulant aerosol units under discussion exhibit no particular peculiarities. They appear to be satisfactory for research studies concerned with the development and improvement of various assessment methods and techniques with simulant agents. (From the author's summary and conclusions)

1302

- Ray, F. E. 1956
SUMMARY OF DEVELOPMENT AND STANDARDIZATION STUDIES ON THE SHIPE SAMPLER, JANUARY 1953. Army Chemical Corps, Fort Detrick, Md. Interim Report No. 110, April 1956. 28 p., illus. DLC-Sci

The ShiPe Sampler was designed to eliminate the long intake tube of the all-glass impinger and to provide a sampler which incorporated a tangential impingement of the cells in a liquid in an attempt to lessen the possible destructive effects occurring as a result of high-speed direct impingement. Comparisons were made with the ShiPe Sampler and various types of other impingers and bubblers. Both *Serratia marcescens* and *Bacillus globigii* were employed as test materials and a wide variety of disseminating devices were employed. In general, the results indicated that aerosol recoveries were higher with the ShiPe Sampler than with the all-glass impinger with vegetative cells, and that the difference between the two samplers was less with smaller mass median diameter aerosols. Studies were carried out to determine the number of bacteria escaping from

samplers, i.e., sampler efficiency. It was found that 0.30 ± 0.06 percent and 3.8 ± 0.2 percent of the total collection slipped by the all-glass impinger and the ShiPe Sampler, respectively. Attention was given to the differences in particle-size selectivity resulting from particulate retention in those samplers having curved intake tubes. While the experimental work in this area is limited, inferences drawn from the aerosol recovery studies indicate that, with heterogeneous aerosols of a large mass median diameter, the lack of particle-size discrimination with the ShiPe Sampler results in higher recoveries. A great deal of study was devoted to attempts to determine the degree of cell destruction effected by samplers. The data indicate the destructive effect of the tangential jet ShiPe Sampler tube somewhat less than that with the high-speed, direct-impingement samplers. Subsequent studies carried out in the United Kingdom and at this installation have led to the development of a modified all-glass impinger. This sampler has a jet-to-flask clearance of 30 mm (AGI-30) and appears to compare favorably with the ShiPe Sampler in recovery of vegetative cells. It has the advantages of low slippage, particle-size discrimination from heterogeneous aerosols, and superiority from an operational point of view. (From the author's summary and conclusions)

1303

- Raynor, G. S. 1957
AN AUTOMATIC PROGRAMMING FILTER SAMPLER. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 122-124. DLC (TD883.A48, v. 7)

The sampling device described consists of three parts: (1) the sampling unit composed of 10 solenoid-operated valves connected to a common chamber through which air is drawn by a vacuum pump; (2) the basic timing unit with two interchangeable electric timing motors; and (3) a program board which can multiply the length of any basic timing cycle, makes possible the collection of samples of unequal duration, causes temporary suspension of sampling at the beginning of or at any point in the sampling cycle, and provides for complete cessation of sampling and timing at any selected time.

1304

- THE RECENT SMOGS. Smokeless Air, v. 26, Spring 1956: 192-193, illus. DLC (TD884.S855, v. 26)

"The winter of 1955-56 brought 2 smog episodes, one on Nov. 17-18 in the northwest (England) which threatened for a time to become a major disaster, and the other on Jan. 4-7. According to the information released by the Department of Scientific and Industrial Research (Gt. Brit.), during the smog in Jan. the concentrations of various pollutants varied considerably from hr to hr and from point to point, due to fluctuations in meteorological conditions and amounts of emissions from local chimneys. In the London area, the smoke content averaged about 90%, and the sulfur dioxide content about 70%, of those recorded during the great smog of 1952 (or about 3 or 4 times the normal for that time of yr); these averages in other towns were

similar to those of London. In the smokeless zone of Manchester, the measurements of smoke gave figures about one half those for the surrounding area. Concentrations of carbon monoxide in the several towns were not much greater than those found in large towns under ordinary weather conditions. It was possible to obtain this statistical information because of the work of more than 500 volunteers who patrolled the streets of several major cities making measurements of air pollution during the course of the smog." (Quoted in part)

1305

- 1958
REFINERS SPENDING MILLIONS IN FIGHT AGAINST AIR POLLUTION. Oil and Gas Jour., v. 56, Feb. 17, 1958: 88-94. DLC (TN860.O4, v. 56)

The distribution of expenditures incurred by refineries for airpollution abatement is outlined. From a survey of 35 companies, controls for sulfur compounds accounted for 1/3 of the total abatement expenses. Control costs for other phases of pollution elimination, in order of expense, are for combustion of hydrocarbons, hydrocarbon recovery measures, smoke and particulate controls, and odor controls. A table of the sources of air pollution and their specific controls is given.

1306

- Rehm, F. R. 1957
INCINERATOR TESTING AND TEST RESULTS. (Presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 199-204, illus. DLC (TD883.A48, v. 6)

Quantitative evaluation of incinerator effluents applies primarily, under existing air pollution laws and regulations, to the particulates evolved. There is no easy way to estimate or predict fly ash or dust emission without the benefit of an actual exit dustloading test. Seldom is visible smoke an appreciable factor in incinerator operation. Because there is so little known of the actual constitution or makeup of odors, it is likely to be some time before quantitative limitations for odor control are set. There are 2 fairly uniformly accepted dust-testing guides now available: American Society of Mechanical Engineers (ASME) "Test Code for Dust-Separating Apparatus", and Western Precipitation Corporation's Bulletin WP-50 "Gas and Dust Measurements". The ASME code sets a limitation of 0.85 lb dust/1000 lb flue gas, adjusted to a 12% carbon dioxide basis or a 50% excess air basis. The difficulties encountered in meeting these specifications are discussed in detail. Some general conclusions, which have been drawn from the incinerator test program, are given as they apply to domestic incinerators (portable, below 5 cu ft capacity), commercial and industrial, and municipal incinerators. (cf. Air Pollution Bibliography, v. II, Abstract no. 902)

1307

- Rehm, F. R. 1957
INCINERATOR TESTING AND TEST RESULTS (the Author's Closure). Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 118-120. DLC

This is a reply to R. L. Daugherty's discussion (cf. Air Pollution Bibliography, v. II, Abstract no. 902) of F. R. Rehm's original paper (cf. Air Pollution Bibliography, v. II, Abstract no. 1306). A table, entitled the Combustion Data for Cellulose -- Dry, shows the present excess air versus percent carbon dioxide. It indicates that a dust loading limitation of a 50% excess air basis would be equivalent to a 13.94% carbon dioxide basis (dry), or that a 12% carbon dioxide basis would be equivalent to a 70% excess air basis. This explains the results reported when calculating incinerator dustloadings on a 12% CO₂ or a 50% excess air basis.

1308

- Reid, E. G. (to U. S. Atomic Energy Commission) 1953
ATMOSPHERIC DUST COLLECTOR. U. S. Patent 2,645,941, July 21, 1953.

This patent covers an airborne device for collecting samples of atmospheric dust. Contained within a streamlined body, which is mounted on an aircraft, it consists of a rotatable cylinder having an intake opening and an outlet with a filter disposed across the path of flow. Means are provided to permit the removal of the filter even when the aircraft is in motion. (Nuclear Sci. Abstracts, v. 7, 1953: 638, [Modified])

1309

- Reidel, J. C. 1955
AIR POLLUTION CONTROL IN THE HOUSTON AREA. Oil and Gas Jour., v. 54, Sept. 5, 1955: 107-109. DLC (TN860.O4, v. 54)

To dispose of large amounts of hydrogen sulfide, the Sinclair Refining Co. of Houston, Tex., has installed a sulfur recovery plant with a capacity of 30 tons/day of commercial sulfur. In this unit, hydrogen sulfide from strippers is converted to sulfur by controlled combustion with air (burning one-third of the hydrogen sulfide to sulfur dioxide), and subsequent reaction between the sulfur dioxide and remaining hydrogen sulfide to form sulfur. The new unit incorporates the latest features including: (1) amine stripper located at the sulfur-recovery unit; (2) operator controls for regulating the amount of amine feeding the amine stripper; (3) provisions for the release of hydrocarbon vapors from the amine stripper to the refinery flare; and (4) reactors and scrubber sections combined in one column with internal-dished heads separating the sections. The plant unit described can be operated by one man.

1310

- Reiter, F. W. 1958
SOLVE WASTE-WOOD DISPOSAL AND AIR-POLLUTION PROBLEMS. *Power*, v. 102, Jan. 1958: 114-115.
DLC (TJ1. P7, v. 102)

A method of burning scrapwood without creating air pollution conditions has been developed by a Dayton, Ohio, wood waste plant. The solution described involves a combination of an incinerator and dutch oven mounted alongside a pulverized-coal burning boiler. The brickwork of the wall connecting oven and boiler has been removed across the upper section to eliminate wood gas and air stratification on entry into the boiler furnace and to secure rapid mixing and complete combustion. Combustion in the dutch oven is an endothermic process while an exothermic reaction takes place in the boiler furnace where heat is needed.

1311

- Reizenstein, M. 1952
SMOKE ABATEMENT IN BALTIMORE. *Air Repair*, v. 1, May 1952: 62-63. DLC (TD883. A48, v. 1)

Regulations in Baltimore, Md., require the installation of indicators to record the smoke discharges from stacks. The analysis of coal samples has been adopted as a means of informing hundreds of occasional smoke offenders that a more suitable coal should be used to give clean stack emissions. The Baltimore Smoke Control Bureau requires that complete information on each piece of fuel-burning equipment be filed and approved before an operating permit is issued.

1312

- Reizenstein, M. 1954
DEVELOPMENT OF INCINERATOR FOR CLEANING BITUMASTIC MATERIAL FROM STEEL DRUMS. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954). *Air Repair*, v. 4, Aug. 1954: 54, 96.
DLC (TD883. A48, v. 4)

To remove bitumastic material from steel drums, the American Cooperage and Steel Drum Co. burned out the contents. Smoke and soot were exhausted by natural draft, through a stack connected to the furnace, spreading these undesirable effluents over the plant as well as their neighbors. Because of this nuisance, an improved incinerator unit was designed and is now in operation. The cans are now conveyed on rail tracks, open end down, and are subjected to natural gas burners which impinge flames upon their outer surfaces. The "gunk" falls out and is removed from the track rails and the immediate area manually. The furnace gases are drawn through a breeching and centrifugal wash collector. The drums are now cleaned thoroughly and economically without polluting the atmosphere with any visible contaminants. (*Public Health Eng. Abstracts*, v. 35, Oct. 1954: 1)

1313

- RESEARCH PROJECT STARTS IN CHICAGO. *Air Repair*, v. 2, Aug. 1952: 22, illus. DLC (TD883. A48, v. 2)

The Armour Research Foundation of the Illinois Institute of Technology started a new research project on air pollution in Chicago, including three major phases: (1) a statistical survey to learn the factors responsible for past smoke violations; (2) a microscopic study, expected to take several years, of Chicago's dustfall to determine the sources (by means of modern analytical methods based on light and electron microscopy, X-ray diffraction, and spectroscopy); and (3) an educational program.

1314

- Resen, F. L. 1955
INDUSTRIAL "REODORANTS" CAN END REFINERY ODOR PROBLEM. *Oil and Gas Jour.*, v. 54, June 6, 1955: 84. DLC (TN860. O4, v. 54)

Chemical "reodorants", e.g., chlorophyll, are used to counteract offensive industrial refinery odors by superimposing one characteristic odor upon another. By this means, obnoxious odors in stack gases, flare gases, and waste water are neutralized without affecting the manufacturing process or product quality. Specific methods, used to abate air pollution at plants producing asphalt, light oils, lubrication oils, and cutting oils by this process, are outlined.

1315

- Resen, F. L. 1955
WHY TALL SMOKESTACKS FAIL TO END AIR POLLUTION WOES IN HOUSTON AREA. *Oil and Gas Jour.*, v. 54, Oct. 3, 1955: 139. DLC (TN860. O4, v. 54)

Smoke stacks have not solved the air pollution problem in the Houston-Gulf coast area (Tex.). Scrubbers, cyclone collectors, and filters must be used with the stacks. The absence of hills in the area has an important topographical effect since lack of a natural updraft causes stack plumes to roll along the ground, contaminating large areas. Meteorological effects have also caused trouble; temperature inversions occur about half the time and are most severe at night forcing plumes to spread instead of rising into the atmosphere. In addition, the high humidity gives rise to low-hanging fogs which tend to hold the discharged gases close to the ground.

1316

- Resen, L. 1958
OXYCAT BURNER HANDLES FLUE GASES. *Oil and Gas Jour.*, v. 56, Jan. 6, 1958: 110-111, illus. DLC (TN860. O4, v. 56)

Flue gas containing unburned oil and gases can be cleaned by exposure to excess oxygen in the presence

of ceramic bricks coated with a thin layer of activated alumina and platinum. This catalyst burns residual oils and carbon monoxide at relatively low temperatures and low oxygen concentrations. The catalyst traverses three burning zones and two cooling zones as it passes downward through the kiln section before regeneration is complete and a new reaction-regeneration cycle begins. Air is injected in the bottom of each burning zone, and flue gases are removed above each burning zone. Flue gas to be further burned enters a manifold for introduction to a system of parallel pipes where oxygen is introduced to provide complete combustion.

1317

- Revinson, D., and J. H. Harley. 1953
SPECTROPHOTOMETRIC DETERMINATION OF FLUORIDE ION. *Analyt. Chem.*, v. 25, May 1953: 794-797, illus.
DLC (TP1.1615, v. 25)

Some of the variables of the color system, thorium ion - fluoride-Chrome Azurol S, have been studied. Based on this study, a spectrophotometric method for determining fluoride has been devised in which fluoride prevents the full color development of the thorium - Chrome Azurol S lake. With the procedure described, from 5 to 90 micrograms of fluoride may be determined with a relative accuracy of 10%. By reducing the volume and using 5,000-cm optical cells, as little as 0.1 microgram may be determined. The method is suitable for a direct analysis of alkaline solutions used to collect fluoride in air sampling with an impinger or bubbler. A modified Willard and Winter distillation can be used when interferences, such as those found in urine and river water samples, are present. (Authors' abstract)

- Rich, T. A. 1955
A PHOTOELECTRIC NUCLEUS COUNTER WITH SIZE DISCRIMINATION. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 60-65, illus. DGS

A variation of the Nolan-Pollak photoelectric nucleus counter for size discrimination is described. Instead of applying an overpressure, the sample in the fogtube of the new instrument starts at atmospheric pressure and expands into 2 evacuated containers. The expansion into the first container is as rapid as possible, and this determines the maximum supersaturation. The expansion into the second is slow enough to permit the growth of water drops to limit the supersaturation below the initial value, and yet fast enough so that the expansion is essentially adiabatic. The calibration is essentially the same as long as the sum of the 2 volumes is constant, and only those particles smaller than the size determined by the initial supersaturation contribute to the reading. (Author's abstract)

1319

- Richardson, J. F., and E. R. Wooding. 1957
CONCENTRATION CHANGES IN AN AEROSOL. *Chem. Eng. Sci.*, v. 7, no. 1-2, 1957: 51-59, illus.
DLC (TP1.C366, v. 7)

A photographic technique for use at low concentrations, and a photometric method for high concentrations, have been developed for determining particle size and concentration in a monodisperse aerosol. Together they may be used to measure radii from 0.1 micron to 5 microns and concentrations of up to 10^7 particles per cm^3 . For concentrations between 10^5 and 10^6 particles per cm^3 , determinations of particle size have been made by both methods, and satisfactory agreement has been obtained. The concentration of particles in a small sample of a monodisperse aerosol is measured as a function of vertical position and time, and the results have been used to verify the differential equation defining the concentration distribution in a system of particles subjected to the combined effects of Brownian motion and gravitation.

1320

- Riley, H. L. 1957
THE COMPLETE ELIMINATION OF DUST FROM GASES AT 300-400°C. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). *Smokeless Air*, v. 28, Winter 1957: 127.
DLC (TD884.S855, v. 28)

This paper discusses the construction and use of a glass-fiber filter for high temperature gas filtration, and the possibility of its utilization for other purposes. (Quoted in full)

1321

- Roach, S. A. 1953
A METHOD OF RELATING THE INCIDENCE OF PNEUMOCONIOSIS TO AIRBORNE DUST EXPOSURE. *Brit. Jour. Indus. Med.*, v. 10, Oct. 1953: 220-226.
DLC (RC963.A23, v. 10)

In relating the incidence of pulmonary abnormalities to dust exposure, it has been customary to compare the incidence with the concentration of dust in groups of men whose duration of exposure was similar. An alternative procedure is to allow for differences in duration of exposure by comparing incidence with dust exposure expressed as the product of concentration and time of exposure, as this may be expected to be related to the amount of dust retained in the lungs. An example is taken of the relationship between dust exposure, and the incidence of simple pneumoconiosis in coal miners. The apparent variation in dust exposure necessary to develop pneumoconiosis as indicated by radiographs is due to a combination of errors in measuring the dust exposure, errors in reading the films, and variations in individual susceptibility. The appropriate analysis is identical with that used in biological assay. Probit and logarithmic transformation may be used to enable

a linear regression of incidence rate on dust exposure to be calculated. This relationship is called an exposure-response curve and gives a measure of the risk of developing pneumoconiosis for a given dust exposure, a measure needed for the establishment of standards of air cleanliness. A decision must first be taken on the maximum risk that can be tolerated, and the dust exposure is reduced below the level corresponding to this risk. This may be done either by dust suppression or by limiting the period of exposure. Exposure-response curves may also be used for comparing different airborne dusts, provided standardized techniques for the survey work are adopted. (Author's abstract)

1322

- [Roberts, C. B., and H. T. Farran]. 1955
VISCOSE CELLULOSE FILM: EFFLUENT GAS TREATMENT AT NORTHERN WORKS. Chem. Trade Jour., v. 137, Oct. 28, 1955: 1157-1158.
 DLC (HD9650.1.O5, v. 137)

A horizontal scrubber, rather than a vertically-designed one, was found to give excellent results in removing hydrogen sulfide from the exhaust gases of casting machines used in the manufacture of viscose cellulose film. In the first scrubbing section, a modification of the Ferrox or Manchester process is used to remove most of the hydrogen sulfide present in the entering gases; in the second section a caustic soda spray is used to eliminate the last traces of hydrogen sulfide; and in the third section a water spray is used to condense any entrained caustic soda before the gases reach the exhaust fan. Less than 5 ppm of hydrogen sulfide is exhausted. Other types of towers are reported to give exhaust-gas concentrations of about 6 ppm, the average being 12 ppm.

1323

- [Robinson, E.] 1956
METEOROLOGICAL STUDIES OF THE PORTLAND AREA. In Lunde, K. E. Investigation of Air Pollution in the Vicinity of Portland, Oregon. Stanford Research Inst., Stanford Univ., Calif. Final Report, Oct. 4, 1956. p. 91-102, illus. (S.R.I. Project no. S-1674).
 DLC (TD883.S8)

Inversion and wind conditions as they relate to air pollution in the Portland, Ore. area are discussed. In addition, visibility conditions are considered briefly. Tabular data are given showing: (1) the frequency of inversions (time of day being plotted against % of days with inversions); (2) the inversion characteristics including median height, % less than 650 ft, and % of total inversions; (3) the frequency of inversions in Portland, Ore. and Los Angeles, Calif. (month of yr being plotted against % of time inversions occurred); (4) the height of inversions in Portland and Los Angeles (base height of inversion being plotted against % of observations); and (5) the annual wind rose for Portland.

1324

- Robinson, E. 1957
DETERMINING FLUORIDE AIR CONCENTRATIONS. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 145-148.
 DLC (RC963.A135, v. 18)

In an area in which fluoride air concentrations are high, filter papers will usually pick up more fluorides than filters similarly exposed in an area with lower fluoride air concentrations. The rate at which the filter paper picks up fluoride from the air is also affected by changes in air concentrations or wind and weather conditions. Tables are included of results obtained in filter paper exposures to varying concentrations of fluoride.

1325

- Rogers, L. H. 1957
HIGH SENSITIVITY CONTINUOUS INSTRUMENTATION FOR ATMOSPHERIC ANALYSES. Chem. Eng. Progr., v. 53, Aug. 1957: 381-384, illus.
 DLC (TP1.A6, v. 53)

Continuous recorders for sampling atmospheric hydrocarbons and ozone are discussed. Methods of increasing the sensitivity of sampling devices include: (1) increase in sampling size at constant reagent volumes; (2) use of increased pressures; (3) extension of light absorbing path length in the infrared filter photometer; and (4) use of selective reagents. Instruments utilizing these various improvements are described, and examples are cited to illustrate new trends in sampling techniques.

1326

- Rogers, S. M. 1957
A REVIEW AND APPRAISAL OF AIR POLLUTION LEGISLATION IN THE UNITED STATES. (Paper presented at the Golden Jubilee Meeting, Air Pollution Control Association, St. Louis, Mo., June 4, 1957). Public Health Service (U.S.). Div. of Sanitary Engineering Services, Washington, D. C., 1957. 33 p., illus.
 DLC-Sci

This discussion of air pollution legislation includes the following phases: historical review, legal aspects of air pollution control, enforcement agencies, smoke emission prohibitions, particulate matter emission prohibitions, permits and fees, sale of fuel burning equipment, enabling authorities, police powers, state legislation, and interstate compacts. Tables are given comparing the status of control legislation of 110 cities in the U. S. Ordinance provisions should be prepared in the clearest terms possible, with definitions, to ensure correct legal and administrative interpretation.

1327

Roll, K. H.

1952

CONTROLLING CORROSIVE AIR POLLUTANTS. Air Repair, v. 1, May 1952: 6-10. DLC (TD883.A48, v. 1)

Methods of controlling the chief corrosive air pollutants, sulfuric acid mist and sulfur dioxide, are discussed. In the case of an aerosol such as sulfuric acid mist, the particles must be coalesced or agglomerated and collected. With the electrostatic precipitator (Cottrell), the gases receive electrical charges which cause them to agglomerate and descend to the bottom of the precipitator for removal. Efficiency of this device can be as high as 99% with a lead-lined steel dome added to the top equipped with a sheet lead stack, which brings the total added height to 30 ft. The Venturi scrubber pulls the acid mist through a constricted throat where a high velocity water spray (250 ft/sec) unites with the acid particles causing them to settle to the bottom of the cyclone chamber of the scrubber. A chemical grade lead (.002 to .02% silver and .04 to .08% copper) is used in these to prevent corrosion by sulfuric acid. The sonic agglomerator operates on the principle that high intensity sound will cause particulate matter to agglomerate. The high intensity sound field is generated by a compressed air siren. Sulfur dioxide is cooled by wetting and passed through precipitators to remove particulate matter. The gas is then passed through lead-pipe cooling coils that convert it in conventional contact process equipment to high-concentration, high-purity sulfuric acid. Some plants dispose of this corrosive gas by making liquid sulfur dioxide. Several chemicals can be used to do this, e.g., dimethylaniline, various alkalies, and ammonium compounds. Methods of absorption, regeneration, and purification are discussed.

1328

Rose, A. H.,

1955

H. H. Black, and R. C. Wanta.
REPORT ON AIR AND WATER POLLUTION STUDIES RELATED TO PROPOSED PETROLEUM REFINERY FOR SAND ISLAND, OAHU, TERRITORY OF HAWAII. Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Dec. 1955. 56 p., illus. DLC-Sci

A study has been conducted to determine the water and air pollution potential of a petroleum refinery proposed for Sand Island, located at the entrance to Honolulu Harbor, with the objective of estimating the impact this industrial development would have on local environment. The scope includes discussions in the following areas: (1) protection of beaches; (2) effect on fishing industry; (3) control and treatment of liquid wastes; (4) atmospheric pollution thresholds; (5) existing sources of atmospheric pollution; (6) refinery discharges of atmospheric pollution; and (7) effects of refinery atmospheric pollution discharges. Winds, which carry offshore the discharged atmospheric pollutants, are predominant. Evidence indicates that threshold limits have been reached in Honolulu in terms of a typical pollution haze and damage to certain genera of vegetation. This is attributed to the photochemical reaction of hydrocarbon vapors and nitrogen dioxide.

1329

Rose, A. H.,

1957

J. S. Nader, and P. A. Drinker.

DEVELOPMENT OF AN IMPROVED SMOKE INSPECTION GUIDE. (Paper presented at the Golden Jubilee Meeting, Air Pollution Control Assoc., St. Louis, Mo., June 4, 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. June 1957. 21p., illus. DLC-Sci

An evaluation of the performance of the reflectance-type and transmittance-type of smoke density measurement devices is given. Based on this analysis, new inspection guides correlating with the normal standards currently in use could be devised. The instrument used in this investigation is the photometer (Photovolt, Model 520-M photomultiplier) capable of measuring luminous flux over four decimal ranges extending from 5×10^{-8} to 5×10^{-3} foot candles. A collimating tube is used which permits a maximum scanning angle of 1.6° . A sighting tube mounted on the collimator permits accurate selection of the area scanned. The film guide tested consists of small film strips of the same neutral coloration as the standard smoke, and for testing purposes is mounted 1 in. from the end of the collimator. Percent blackness values were chosen corresponding to normal Ringelmann Chart values. A complete evaluation of the performance of the film guide is given.

1330

Rose, A. H.,

1957

and D. G. Stephan

STATUS REPORT ON AUTO EXHAUST CONTROL RESEARCH, 1957. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 81-85. DLC (TD883.A48, v. 7)

Research on automobile exhaust control is carried out in two areas: (1) determination of specific contaminants involved in smog formation and the establishment of threshold values, as well as maximum allowance concentrations, for these contaminants; and (2) the development and evaluation of control devices, equipment modifications, and techniques. The development of new applications to the problem are outlined and the agencies of research and progress in the exhaust control are discussed. A bibliography is included.

1331

Rose, A. H.,

1957

and D. G. Stephan.

STATUS REPORT ON AUTO EXHAUST CONTROL RESEARCH---1957. Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. June 1957. 20 p. DLC-Sci

See Air Pollution Bibliography, v. II, Abst. no. 1330.

1332

- Rossano, A. T., Jr. 1956
THE JOINT CITY, COUNTY, STATE AND FEDERAL STUDY OF AIR POLLUTION IN LOUISVILLE. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 176-181, illus. DLC (TD883.A48, v. 6)

During World War II and the post-war years, the character of air pollution in Louisville, Ky., shifted from smoke and fly ash to the more heterogeneous type involving emissions of a variety of gases, fumes, dusts, and odors more characteristic of an urban complex. This situation was intensified by the location there of large synthetic rubber plants. A joint Federal, State, and local study of the pollution problem was initiated Jan. 2, 1956. The quality of the air in and around the West End area of the city is being determined, and the interrelationship between air quality and both meteorologic and micro-meteorologic factors is being studied. An air sampling network has been laid out involving 6 fixed air sampling stations together with a mobile unit mounted on a truck. Two innovations are the standard shelter, designed especially for this study, and the orientation of the main axis of the high volume sampler in a vertical rather than horizontal plane, minimizing any preferential effects of wind direction. A third important phase of the study is an inventory of air pollution sources in the rubber-factory area. Another major phase is a survey of the nature and origin of objectionable odors in the West End. A pilot study is underway to determine the nature, extent, and relative frequency of intense local emissions to the air resulting in objectionable odors, excessive dust, or related discomforting conditions among residents in the West End. The undertaking is exploratory, and depends largely on the cooperation of a corps of trained volunteer observers located in the area. The whole study is especially designed to give attention to the importance of maintaining an adequate public information activity and good public relations. (Quoted in part)

1333

- Rossano, A. T. 1957
THE LOUISVILLE STUDY. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956). Publ. Health Rep., v. 72, Jan. 1957: 67-70, illus. DLC (RA11.B17, v. 72)

Residents of a residential area in Louisville, Ky., complained of odors, dust, and eye irritation. The area is adjacent to industrial plants, popularly called "Rubbertown", producing rubber or its components. A comprehensive study of the air pollution problems of the area is now underway. The first objective is to analyze the air in and around the West End for various particulate and gaseous pollutants, and for variations and fluctuations in their concentrations. The second major objective is to study the relation of meteorological and micro-meteorological factors on air quality. In carrying out these objectives, it was decided to: establish a comprehensive network of fixed observation stations; measure simultaneously and continuously on a 24-hr basis; keep

sampling periods as short as practicable in order to study diurnal patterns; and analyze thoroughly the samples. Nine sampling stations have been laid out on arcs 2 and 3.5 miles from Rubbertown. Two conventional high-volume samplers using glass-fiber or cellulose filter paper and mounted so that the principal axis is vertical rather than horizontal, operate alternately at each site on an 8-hr cycle collecting 3 samples daily from each. A third objective is to inventory air pollution sources in Rubbertown in order to determine the nature and rate of industrial discharges, and to develop control measures. Also a survey of the nature and origin of objectionable odors in the West End is being made, and a pilot study will determine the nature, extent, and relative frequency of intense local air pollution.

1334

- Rossano, A. T., and N. E. Schell. 1957
PROCEDURES FOR MAKING AN INVENTORY OF AIR POLLUTION EMISSIONS. (Paper presented at the Golden Jubilee Meeting, Air Pollution Control Assoc., St. Louis, June 3, 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 16 p. DLC-Sci

The step-by-step procedure for studies of air pollution involving both a single source and multiple sources is outlined and discussed. A reasonably accurate estimate of emissions from multiple sources, such as transportation, heat and power production, and waste incineration, can be made on the basis of such available figures as quantities of fuel and wastes burned, in conjunction with knowledge of products of combustion. Modifications often occur in the case of specific source studies, although procedures have been established for some types of sampling.

1335

- 1957
ROTARY LIME KILNS PROVIDED WITH CYCLONIC SCRUBBERS TO ELIMINATE DUST EMISSION. Indus. Heating, v. 24, Aug. 1957: 1542, 1550. DLC (TH7201.15, v. 24)

Cyclonic type scrubbers have been as high as 99.38% effective in eliminating dust emission from rotary lime kilns at the Electro Metallurgical Co., Niagara Falls, N. Y. The dust-laden gases from the kilns are passed up through the sprays of water in a rotary motion. The dust collects in the form of sludge and is transferred to large pumps and out to a settling basin. Each scrubber is designed to handle 29,000 cu ft of gas per min. Approximately 1150 gal of water are used per min. The temperature of the inlet dust-laden gases is 1350°F and the clean gas is discharged at 450°F.

1336

- Rubin, M. 1952
THE PROBLEM OF SMOKE IN BUENOS AIRES. Air Repair, v. 2, Nov. 1952: 20-21, illus. DLC

The problem of smoke in Buenos Aires has increased manifold since 1943, due to rapid industrial development. Inferior fuel is being used because of the great demand, and old machinery has not been replaced by better, modern methods. Mechanical precipitators will have to be considered, since high-tension electricity cannot be depended upon. In order to prevent the accumulation of industrial air pollution in the big cities, industries will have to be established in areas presenting natural air currents and favorable properties of soil.

1337

Rubin, S.

LIQUID PARTICLES IN ATMOSPHERIC HAZE. Jour. Atmospheric and Terrestrial Phys., v. 2 (2), 1952: 130-140, illus. DLC (QC801.J6, v. 2)

During a study of smog in the Los Angeles area many observations were made concerning the aerosol components in polluted air. The sampling was done at ground level. Observations extended over more than 2 years. A modified jet impactor, and an alternating potential electrostatic precipitator were used as collecting devices. Microscopic examinations of particles in industrial haze showed them to be liquid droplets of rather low volatility, from 0.2 to over 10 μ in size. Microscopic analyses showed the presence of a wide variety of substances (sodium chloride, sulfuric acid, nitrous and nitric acid, ammonium compounds, organic substances, etc.) as condensation nuclei in both rural and urban regions. The large quantities of hygroscopic liquid found in samples of combustion gases, and the high concentration of the liquid aerosol found in foggy atmospheres suggest that the liquid aerosol which constitutes the visible haze acts as condensation nuclei for fog formation. The frequent occurrence of low humidity fogs in the Los Angeles area and in other cities appears to be a consequence of condensation on these large aerosol particles.

1338

Ruff, R. J.

CATALYSTS HELP TO ELIMINATE FUMES AND ODORS. The Plant, v. 7, June 1953: 60-63. DLC (TS155.A1P49, v. 7)

The design features of a complete catalytic fume combustion system are reviewed, and the oxidation process involved is outlined. The function of catalysts and their limits are defined. The type of oxidation considered is broadly applicable to hydrocarbon and organic-type fumes, including alcohols, esters, ketones, ethers, acrolein, aldehydes, hydrogen, carbon monoxide, and mercaptans. The efficiency varies from 97.5% for fume energy concentrations of 1 Btu/standard cu ft to higher efficiencies for greater fume concentrations. Catalytic systems have been designed for volumes as low as 20 cu ft/min, and some for capacities over 20,000 cu ft/min. The catalyst used is a coating of platinum alloy bonded to nickel alloy ribbons similar in appearance to a metallic air filter mat. Some units have given over 23,000 service-free operating hours.

1339

Ruff, R. J.

CATALYTIC COMBUSTION CONTROL IN CORE-BAKING OVENS. Amer. Foundryman, v. 24, Dec. 1953: 42-44. DLC (TS200.A7527, v. 24)

A catalytic combustion unit was installed on the exhaust of a Los Angeles, Calif., core-baking oven to prevent recurrence of an explosion which resulted from the buildup of a coreoil vapor to explosive range. The unit consists of a preheat burner at the oven outlet, exhaust fan, catalyst element, and stack element. The catalytic units have been in use for 24,000-hr operation without requiring any service. Automatic control of combustible vapors is accomplished through control circuit of fume combustion system. A limit protection thermostat is installed on the discharge side of the catalyst to provide protection against excessive concentrations.

1340

Ruff, R. J.

DESIGN FACTORS IN CATALYTIC FUME ELIMINATION. Heating and Ventilating, v. 50, Sept. 1953: 84-86. DLC (TH7201.H4, v. 50)

An important source of air pollution, the hydrocarbons that cause irritation and reduced visibility, can be curtailed by the use of catalytic combustion units. These units serve to combust fumes containing hydrocarbons and their decomposition products, such as aldehydes, alcohols, esters, acrolein, mercaptans, and carbon monoxide, into carbon dioxide and water. Platinum is the most frequently used catalyst because of its stability and good catalytic properties at relatively low temperatures. Many of these catalytic combustion units were introduced primarily to recover the energy normally lost when the hydrocarbons are eliminated as fumes. The process of catalytic combustion is not suitable for fumes containing large amounts of vaporized metals, cinders, and inorganic solids.

1341

Ruff, R. J.

FUME DISPOSAL BY CATALYTIC COMBUSTION CREATES NEW MARKET FOR GAS USE. Gas Age, v. 111, Mar. 26, 1953: 33-36. DLC (TP700.G14, v. 111)

Oxidation of organic vapors to CO₂ and water vapor by combustion of these gases over a catalyst of high-temperature nickel ribbons coated with platinum has been used to control industrial air pollution. A mat of this activated ribbon is enclosed between 2 heat-resistant screens and mounted in an alloy frame. The typical catalyst element is 2 1/2 in. by 18 in. by 24 in., and is capable of handling approximately 130,000 cu ft of air/hr at a discharge temperature of 1150° F. The plant being installed now limits the temperature of the gases leaving the catalyst to 1200° F or lower. Heat in the effluent gases can be used to preheat the unburned gases. Catalytic combustion units are not suitable for use where the fumes contain large amounts of cinders,

inorganic solids, or vaporized metals. Ordinary atmospheric dust and low concentrations of some inorganic materials can be passed through the catalyst without using a dust remover device. The following examples of specific applications are discussed: the catalytic control of effluents from the manufacture of phthalic anhydride; enameled copper wire; paints and varnishes; etc.

1342

- Ruff, R. J. 1954
CATALYTIC METHOD OF MEASURING HYDROCARBON CONCENTRATION IN INDUSTRIAL EXHAUST FUMES. In Symposium on Odor (Presented at the Fifty-Seventh Annual Meeting of the American Society for Testing Materials, Chicago, Ill., June 15, 1954). Philadelphia, 1954. p. 13-21, illus.; discussion p. 21-22. (ASTM Special Technical Publication no. 164)
DLC (TD887. A55, 1954)

A portable instrument is described which employs the principle of catalytic combustion to determine the concentration of hydrocarbons in industrial exhaust gases. The apparatus consists of a 10 cu ft/min blower; a throttling damper on the entry side; electric preheaters controlled by variable transformers; a catalyst cartridge bearing thermocouples on the entry and exit sides; and a pyrometer, which serves both thermocouples. The hydrocarbon concentration is read in terms of the temperature rise across the catalyst. To determine the minimum temperature for catalytic oxidation, the preheaters are set low and the temperature of the incoming gas is increased slowly until there is an abrupt rise in the temperature reading of the exit thermocouple. Dilution techniques can be applied to derive quantitative estimates. A unit designed for continuous sampling service is available. Tabular data are included.

1343

- Ruff, R. J. 1956
CATALYTIC COMBUSTION FOR METAL LITHOGRAPHING OVENS. *Organic Finishing*, v. 17, Apr. 1956: 12-15.
DLC (TP934.057, v. 17)

The use of catalytic combustion to destroy the fumes from metal-decorating ovens is described. The combustion system consists of an insulated housing, with inlet- and outlet-duct connections containing a preheat burner with necessary ignition-, control-, safety- and limit-protection circuits, exhaustor, and catalyst elements. The catalyst is a nickel alloy coated with platinum. The performance of the catalyst is given along with data for a typical coating oven used for drying lithographed sheets.

1344

- Ruff, R. J. 1957
CATALYTIC FUME COMBUSTION OF ORGANIC CHEMICAL AND PETROCHEMICAL WASTES. *Indus. Wastes*, v. 2, May-June 1957: 67-70.
DLC

Oxidation reactions and their applications to catalytic fumes combustion are discussed. It is pointed out that kettle-cooking and still operations liberate a wide range of organic contaminants at processing temperatures ranging from 500°F to approximately 750°F. The self-recuperative system of heat- and power-recovery considered here provides a practical means of efficiently and economically oxidizing these fumes. An oxygen supply can be added to this system for the complete combustion of hydrogen sulfide, mercaptans, or organic nitrogen compounds which give offensive odors even in trace concentrations. The desired end product in the oxidation of sulfur gases can be obtained by controlling the oxygen supply or the operating temperature of the catalyst.

1345

- Ruff, R. J. 1957
FUME ELIMINATION FOR WIRE-ENAMELING OVENS. *Wire and Wire Products*, v. 32, Jan. 1957: 62-64.
DLC (TS270. A1W5, v. 32)

The catalytic combustion system used in wire-enameling ovens to eliminate hydrocarbons and other organic compounds is described. As the coated wire enters the oven, the low-boiling solvents, e.g., naphthas and xylols, are quickly vaporized. At the final baking temperature, 500° to 700°F, the organic acid, oils, and some of the resins are vaporized and enter the oven atmosphere. "Cracking" occurs forming aldehydes and other unsaturated hydrocarbons. These exhaust gases are preheated by a gas or oil burner to initiate an oxidation reaction. The fumes are directed through a catalyst which accelerates the fume-burning process, permitting oxidation to take place around 500°F. The appearance of the catalyst is similar to that of an air filter. It is made of platinum deposited on thin ribbons of nickel alloy. Catalysts of this type have exceeded 15,000 hr of operation in wire-enameling ovens. It is pointed out that by the use of an air recirculating system, heat from the fume combustion can be utilized in the enamel-baking operation. Diagrams of the system are included.

1346

- Rugg, J. S. 1952
OZONE CRACK DEPTH ANALYSIS FOR RUBBER. *Analyt. Chem.*, v. 24, May 1952: 818-821, illus.
DLC (TP1.1615, v. 24)

The factors that control weathering and ozone resistance of natural rubber and other elastomers are not fully understood. A major deterrent to a better understanding of these factors is the lack of a satisfactory quantitative method of analyzing the results of ozone and weathering tests. A method has been developed, which follows the change in crack depth as the criterion of the extent of damage that has taken place. It has been shown that when crack growth takes place, the depth increases proportionally. The depth of the crack is measured with the 20x microscope in a cross section made normal to the length of the cracks. The major cracks, which have the directing influence on the extent

of cracking, are the deepest ones and are all nearly the same length. The method has been used to analyze results of ozone cracking in which commonly recognized variables were employed. The results confirm some previously reported trends with quantitative data. This method can be used in measuring the effect of compounding variables, where results are desired in terms of a dimension of actual ozone cracks. It should contribute to a better understanding of the factors that control weathering and ozone resistance of natural rubber and other elastomers. (Author's abstract)

1347

- Rupp, W. H. 1956
AIR POLLUTION SOURCES AND THEIR CONTROL. In Air Pollution Handbook. New York, McGraw-Hill Book Co., Inc., 1956. Section 1, p. 1-1 to 1-58, illus. DLC (TD883.M35)

This review of air pollution sources and their control includes the following subjects: (1) abatement and control of sources; (2) source of control problem; (3) contaminant groups; (4) source of control methods; (5) importance of economics; (6) source control of major emissions, smoke, industrial dusts, sulfur oxides, fumes and odors; and (7) industrial check list of fuels and types of emissions from each fuel. Tables and illustrations are included.

1348

- Russell, H. H. 1957
A SUMMARY OF THE FLY-ASH DISPOSAL PROBLEM. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 46-47. DLC (TD883.A48, v. 7)

The disposal and utilization of fly ash are discussed, and a number of its uses are listed. Since the composition of fly ash determines its applications, specifications of the American Society for Testing Materials for the chemical and physical properties of fly ash are given.

1349

- S. R. I. PUTS THE SPOTLIGHT ON L. A. SMOG: TOO MUCH FAMOUS CALIFORNIA SUNLIGHT CAUSED SMOG BY CATALYZING UNUSUAL REACTIONS BETWEEN GASEOUS ORGANICS. Chem. and Eng. News, v. 32, Aug. 16, 1954: 3256-3259. DLC (TP1.C35, v. 32)

A study of the Los Angeles smog problem by the Stanford University Research Institute (supported by the Western Oil and Gas Assoc.) is presented. The following factors combine to produce smog in Los Angeles: (1) mountains surrounding the Los Angeles basin and prevailing weather patterns causing stagnation of air; (2) a great volume of volatile organic materials resulting from automobiles, incinerators and gaseous emissions; (3) strong and enduring sunlight, which appears to trigger chemical reactions; and (4) a high concentra-

tion of ozone (the highest known on the earth's surface). Los Angeles air differs from that of other urban areas because of the presence of a large quantity of oxidants, chiefly ozone. Smog concentration is usually absent at night, rises until midday up to 40 parts per hundred million, then decreases again until below 5 at night. Ground-level ozone is formed by atmospheric reactions, e.g., by irradiation of the air with light of wave lengths between 3600 and 4000 Å. It will be most important to determine which of several possible reactions is chiefly responsible for ozone formation. The reactions of chemicals in extreme dilutions, as they occur in the air, are another problem of importance. Experiments have shown that in Los Angeles the air contains materials which are capable of producing ozone by irradiation. After elimination of nitrogen dioxide, aldehydes, and ketones from atmospheric air samples, ozone is still formed by irradiation. Its origin, therefore, remains unknown. Some types of vegetation suffer smog damage which cannot be duplicated experimentally by the action of any known air pollutant and is identical to that resulting from mixtures of ozone and unsaturated hydrocarbons. Other smog effects appear to result from oxidation of hydrocarbons in the presence of nitrogen dioxide and sunlight. Further research depends on new and improved instruments.

1350

- Sachsel, G. F., 1957
and J. E. Yocom.
FUME CONTROL IN A FERTILIZER PLANT: A CASE HISTORY. Jour. Air Pollut. Control Assoc., v. 6, Feb. 1957: 214-218, illus. DLC (TD883.A48, v. 6)

In order to combat the difficulties of caking of fertilizers, a plant at Saginaw, Mich. instituted a system of drying the product and found that a different problem had been added, that of a clearly visible exhaust plume from the dryer. Correction of the pollution condition necessitated the installation of a secondary collector which was at first operated as a dry and later as a wet collector. Although the plume from the stack is still visible, much of it appears to be made up of water droplets which evaporate rapidly.

1351

- Saltzman, B. E. 1954
COLORIMETRIC MICRODETERMINATION OF NITROGEN DIOXIDE IN THE ATMOSPHERE. Analyt. Chem., v. 26, Dec. 1954: 1949-1955. DLC (TP1.I615, v. 26)

The determination of nitrogen dioxide in the atmosphere has heretofore been hampered by difficulties in sample absorption and lack of specificity. A new specific reagent has been developed and demonstrated to absorb efficiently in a midjet fritted bubbler at levels below 1 ppm. The reagent is a mixture of sulfanilic acid, N-(1-naphthyl)-ethylenediamine dihydrochloride, and acetic acid. A stable, direct color is produced with a sensitivity of a few ppb for a 10-minute sample at 0.4 liter/minute. Ozone in 5-fold excess and other gases in 10-fold excess produce only slight interfering effects; these may be reduced further by means which are described. (Author's abstract)

1352

- Saltzman, B. E., 1956
D. H. Byers, and F. L. Hyslop
NITROGEN OXIDE IMPURITIES IN OZONE. *Indus. and Eng. Chem.*, v. 48, Jan. 1956: 115-118.
DLC (TP1.16, v. 48)

The results are given of a study of the effects of voltage and flow rate on the nitrogen oxide and ozone output of an ozonizer with a phenolformaldehyde resin dielectric material. When the ozonizer is operated at reasonable flow rates and voltages, the nitrogen oxide impurities amounted to less than 5% of the ozone concentration. Kinetic and equilibrium data show that of all oxides of nitrogen and related compounds, only nitrogen dioxide, nitrogen pentoxide, and nitric acid vapor required consideration as impurities in ozone. When ozone is present in excess, the oxidation of nitrogen dioxide proceeded rapidly to near completion.

1353

- Sanders, W. M., III. 1955
BW EVALUATION: PRESSURIZED BUILDING 7-635.
Army Chemical Corps, Fort Detrick, Md. Interim Report No. 104, Sept. 1955. 16 p.
DLC-Sci

This report covers three tests to determine the amount of protection against bacterial aerosols afforded by a building pressurized above the outside static pressure and constructed with three different roof shapes. The aerosol was produced by a generator containing non-pathogenic organisms [*B. subtilis* var. *niger*] and placed 150 feet upwind from the building. Cotton collector samplers and membrane filter samplers located outside and inside the building sampled for periods up to six hours during the three tests. The results indicate that no particular roof shape gave more protection than the others, but that a slight internal pressure, above the outside static pressure, was adequate protection against bacterial aerosols. (From the author's abstract)

1354

- 1952
THE SANITARY INSPECTOR AND SMOKE ABATEMENT.
(A Memorandum by the [National Smoke Abatement] Society to the Sanitary Inspectors' Working Party).
Smokeless Air, v. 23, Autumn 1952: 20-21.
DLC (TD884.S855, v. 23)

The Minister of Health, in July 1951, set up a Committee, to inquire into the nature of the work at present being done in Great Britain by Sanitary Inspectors, and to gain information on their recruitment, training, and qualifications. The National Smoke Abatement Society was invited to express its views. The Executive Council submitted a memorandum which was later discussed at a meeting between the Committee and representatives of the Society. This memorandum was summarized as follows: The present form of smoke control under the Public Health Acts is likely to continue for a number of years and should be as effective as possible. All sanitary inspectors should be required to possess basic qualifications in atmospheric pollution prevention work,

comparable with the present Smoke Inspector's Certificate. Specialization in smoke abatement work should be acknowledged by an improved type of Certificate.

1355

- Sawyer, F. G., 1952
and W. E. Rand.
CHAOS VERSUS PLANNING IN INDUSTRIAL AIR POLLUTION. *Air Repair*, v. 2, Aug. 1952: 44-46. DLC

Research on air pollution in the Los Angeles region is being carried out by the Los Angeles County Air Pollution Control District, the California Institute of Technology, the University of California at Los Angeles, the University of Southern California, and the Stanford Research Institute, with more than two thirds of the money provided by the Western Oil and Gas Association. The following suggestions have been offered: after a plant location has been selected, plans of the effluent discharge system should be examined to see where they can be improved. A low stack with a high effluent temperature and exit velocity may have the same diffusion pattern as a high stack with a low effluent temperature and exit velocity. Meteorological studies are useful in selecting the best design and location for pollutant discharge points. A study of wind peculiarities within a company's property may tell where piles of powdery materials would best be located. With several large corporations the problems related to air pollution have become so complex as to necessitate the creation of a pollution expert position. This expert should spot potential trouble before it becomes severe, so that necessary steps may be taken to avoid costly difficulties and litigation. Keeping abreast of all technical and scientific developments in the field of air pollution, he should supply the management with the necessary guidance and assist the company lawyer in technical matters. His position and title should be such that they will command respect in scientific, public and legal circles. Prevention and abatement of air pollution should be of basic concern in industrial planning.

1356

- Schafer, R. D. 1958
HOW OHIO IS SOLVING THE ALFALFA DUST PROBLEM. *Arch. Indus. Health*, v. 17, Jan. 1958: 67-69.
DLC (RC963.A14, v. 17)

Methods of dust control used in the alfalfa dehydration industry are considered. Oil or animal fat has been added to the meal in the process of dehydration causing the tiny particles to collect and increasing the efficiency of the cyclone separators. In cases where this does not provide for a sufficient reduction in dusts, a cloth filter is used to filter the dust from the cyclones.

1357

- Scheffer, T. C., 1955
and G. G. Hedgcock.
INJURY TO NORTHWESTERN FOREST TREES BY

SULPHUR DIOXIDE FROM SMELTERS. Department of Agriculture, U. S. Forest Service. Tech. Bull. no. 1117. June 1955, 49 p. DA

Extensive studies were made of 2 timbered areas in the states of Wash. and Mont., which were affected by sulfur dioxide from large ore smelters. Most of the observations were made on coniferous timber. Underlying factors of sulfur dioxide injury, and of the dissemination of the gas are described. The chief external criterion of injury was the typical leaf markings. A shrub, Pacific ninebark, was particularly sensitive and aided considerably in establishing limits of influential amounts of gas. Sulfur assay of foliage corroborated earlier findings that the presence of sulfur dioxide results in abnormal accumulations of sulfur, but it is apparently the rate not the amount which determines the extent of injury. Tables are presented listing the order of observed susceptibility of forest trees, shrubs, and herbs to sulfur dioxide injury. Conifers generally were more severely injured by smelter fumes than were deciduous trees. Winter damage was much less than summer. First year Ponderosa seedlings were much more susceptible than larger transplanted trees. Ponderosa saplings and larger trees (i. e., pole size) were also reduced in vigor and killed during a year of heavy fumigation, showing no greater tolerance with maturity. In moderate sulfur dioxide injury, Douglas fir saplings responded as the Ponderosa saplings did, but nearer the smelter the former were much more severely affected. Under the influence of progressively larger amounts of sulfur dioxide in the atmosphere, diameter growth seemed to be retarded a few years earlier than height growth.

1358

Schepers, G. W. H., 1955
and A. B. Delahant.

THE ANTAGONISTIC BIOLOGICAL ACTION OF QUARTZ AND POTASSIUM CARBONATE: AN EXPERIMENTAL STUDY ON GUINEA PIGS. Arch. Indus. Health, v. 12, Aug. 1955: 109-115, illus. DLC (RC963. A14, v. 12)

Intratracheal and intraperitoneal injections were made experimentally into guinea pigs using a mixture of quartz dust and potassium carbonate in a 3:2 ratio. The potassium carbonate effectively inhibited the necrotizing and fibrogenic action of the quartz dust, despite the fact that the solubility of silicon dioxide is increased by potassium carbonate. (Authors' abstract in part)

1359

Schepers, G. W. H., 1957
THE BIOLOGICAL ACTION OF DEGUSSA SUBMICRON AMORPHOUS SILICA DUST (DOW CORNING SILICA). Arch. Indus. Health, v. 16, Dec. 1957: 499-513. DLC (TH7201. H14, v. 16)

Injection experiments on rats, guinea pigs, and rabbits, using the Degussa submicron amorphous silica dust, are described. The routes explored were the intraperitoneal, intratracheal, and intravenous. The intraperi-

toneal introduction of 200 mg of dust in guinea pigs caused death. For the majority of the rats the dust also proved lethal when administered intratracheally in a 37.5 mg dose. Guinea pigs tolerated an intratracheal dose of 75.0 mg. Of five rabbits three died of doses of 100 mg to 1,000 mg of dust introduced intravenously, while two survived injections of 1,000 mg. The practical and theoretical significance of these observations is discussed.

1360

Schleichter, M. E. 1952
PAINT COMPANY BEATS ODOR AND FUME PROBLEM WITH SPECIAL MEASURES. Air Repair, v. 2, Nov. 1952: 27-29. DLC (TD883. A46, v. 2)

A Buffalo, N. Y. company has installed equipment that successfully eliminates the fumes generated during the processing of different types of oleoresinous varnishes, alkyd resins, and bodied oils. It consists of a combustion unit and a double manifold that collects the fumes and discharges the byproducts of combustion. The fumes are diluted with fresh air and preheated to bring the mixture of fumes and air to the catalytic ignition temperature of approximately 500° F. Complete oxidation of the fumes occurs when the mixture passes through the catalytically active elements. The colorless effluent is mainly carbon dioxide, water vapor, and excess nitrogen left from the air. The catalytic element used is similar to a metallic air filter mat and consists of resistant metallic ribbon, processed to provide a maximum surface area, enclosed between heat resistant alloy screens. The catalyst is expected to last for at least 5000 hr of operation without reactivation. The method of operation is explained, and charts and illustrations are used.

1361

Schone, V. 1953
[MEASUREMENTS OF CONDENSATION NUCLEI ON THE BROCKEN] Kernzahlmessungen auf dem Brocken. Zeitschrift für Meteorologie (Berlin), v. 7, Sept. 1953: 275-282. DLC (QC851. Z4, v. 7)

The relationship between condensation nuclei and various meteorological conditions on the Brocken (highest peak of the Harz Mountains in Germany) was studied, taking as a basis the measurements of condensation nuclei made in 1950. The numbers of condensation nuclei were seen to depend upon time of day, wind direction, wind strength, and relative humidity. They present a minimum early in the morning, increase to a maximum around noon, lasting until about 3 p. m., then decrease; minimal numbers are found during west winds, maximal numbers during east-south-east winds; they diminish with increasing wind strength; maximal numbers were found for 40-49% humidity, diminishing with increasing or decreasing humidity and reaching a minimum in the driest as well as in the most saturated air. The distribution of condensation nuclei was studied between the Brocken (1142 m.) and the village of Schierke (640 m.) by the filling-and-sucking method.

1362

Scholl, A. W.,

J. Bubernak, and R. R. Galford.

1952

CARCINOGENIC EFFECTS OF PYROLYZED HYDROCARBONS FROM INTERNAL COMBUSTION ENGINES EXHAUST FUMES (A PRELIMINARY REPORT). Proc. West Virginia Acad. Sci., v. 33, 1952: 79-83.

DLC (Q11.W597, v. 23)

A project is being carried out at Marshall College, Huntington, West Virginia, on the possibility of isolating carcinogenic materials from gasoline engine exhaust fumes. Experiments were made using a mixture of lubricating oils and gasoline, or pure gasoline, for fuel. The oily fraction obtained after condensation, filtration, and separation (into aqueous solution and oily residue) of the exhaust material was found to contain a significant amount of pyrolyzed hydrocarbons, (whose carcinogenic property is well known) especially in the case of the mixed fuel. It was calculated that for each gallon of gasoline consumed, 113 ml of pyrolyzed carbon mixture is dispersed into the air. Chromatographic separation of the exhaust materials in 3 consecutive fractions, showed 72.6%, 3.04% and 1.2% of pyrolyzed hydrocarbons respectively in the total material. Animal testing for carcinogenicity of polycyclic aromatic hydrocarbons from exhaust fumes of a gasoline automobile engine, was done by the skin painting procedure applied twice weekly to the ear of white rats. The samples tested were obtained from gasoline exhaust only, from the combustion of 1:20 or 1:10 oil-gasoline fuel, or from fractions separated on the chromatogram. The experiments were still underway at the time of writing.

1363

Schrenk, H. H.

1952

A SCIENTIST VIEWS THE AIR POLLUTION PROBLEM. Air Repair, v. 2, Aug. 1952: 17-20.

DLC (TD883.A48, v. 2)

Health effects of air pollution are difficult to determine because adverse conditions of health can be caused by a single substance in the absence of other pollutants, by one of many pollutants, or by the action of a combination of pollutants. The first step in evaluating the effect of pollution is to determine its cause. Virtually every process or operation which produces gases, vapors, or fine particulate matter is a potential source of atmospheric contamination. The data on the kind and amount of pollutants disseminated must be obtained in order to evaluate their significance. Therefore, efficient sampling procedures must be developed for specific contaminants. In addition, the effects of time changes and meteorological parameters such as wind direction, temperature gradient, etc., must be considered. Knowing the specific causative agent, the problem of control can be solved by engineering research and development.

1364

Schrenk, H. H.

1953

INDUSTRIAL HYGIENE: CURRENT RESEARCH ON THE EFFECTS OF DUSTS. Indus. and Eng. Chem., v. 45, Aug. 1953: 111A-114A.

DLC (TP1.I6, v. 45)

Dust particles recovered from human and animal lungs were 1-3 microns in size. Reaction to ground flint particles injected into animals increased with a decrease in particle size; however, there were no deaths. Another synthetic dust of 0.2-micron size, likewise injected, resulted in 100% mortality. In a study of the site of dust retention in the body, particles of 1-micron size were found in the alveolar spaces, while larger particles lodged in the upper respiratory tract. Using ground calcined flint, it was again shown that the stages of fibrosis depended on the particle size and surface area.

1365

Schueneman, J. J.

1955

A SURVEY OF AREAS OF INTEREST IN AIR POLLUTION PROBLEMS. (Paper presented at the Air and Water Pollution Conference, University of Missouri, Nov. 29, 1955). Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1955]. 19 p.

DLC-Sci

A review of air pollution in the U. S. is given. Topics reviewed include: (1) a definition of the problem; (2) effects of air pollution; (3) sources of air pollution; (4) locations of contaminated areas; (5) factors affecting the distribution of polluted air; (6) provisions of legal controls; (7) agencies of control; (8) methods of air pollution studies; and (9) control procedures. Tables are included.

1366

Schueneman, J. J.

1956

THE AIR POLLUTION PROBLEM IN PORTLAND, OREGON. Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Sept. 1956. 20 p.

DLC-Sci

An analysis of the air pollution problems in Portland, Oregon, is presented. The following items are briefly discussed: sources of pollution, general indications of the extent of pollution, sources outside the city, and meteorological and topographical considerations. Present activities of the Bureau of Health, the Bureau of Buildings, and the Oregon State Air Pollution Authority are reviewed and zoning laws discussed. In view of the existing air pollution situation the suggested program of abatement encompasses law changes, a monitoring program, and a program of technical study.

1367

Schueneman, J. J., and S. Rogers.

1956

THE AIR POLLUTION PROBLEM IN STEUBENVILLE, OHIO. Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Dec. 1956. 24 p.

DLC-Sci

The report gives an analysis of the air pollution problem in Steubenville, Ohio, including the Ohio River

Valley portion of Jefferson County, Ohio, and Broot and Hancock Counties, West Virginia. The geography, population, industrial and commercial activities, meteorological aspects, and land use are discussed. The sources that contribute major quantities of pollution are steel mills, coal-fired steam power plants, coke plants, ferro-alloy plants, and foundries. Contributions of transportation and commercial consumption to air pollution are evaluated. The air pollution problem includes blackening of buildings, accumulation of dust, reduced visibility, and causation of offensive odors and tastes. Official control agencies include both state and local levels. --- Ordinances and laws are quoted, and a suggested approach to abatement is outlined. Tables are included.

1368

Schueneman, J. J.

1957

THE DENVER AREA AIR POLLUTION PROBLEM. Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. June 1957. 78 p. DLC-Sci

A review of the air pollution situation in the Denver, Colorado area is presented. The following items are discussed: types of activity causing air pollution, evidence of pollution levels, meteorological and topographical influences on dispersion of pollutants, existing or authorized governmental activities for the control of pollution, and other relevant community characteristics. The study area includes the City and County of Denver and the three surrounding counties. Present pollution in the city's atmosphere is caused by automobiles and other vehicles, refuse burning, industries, space heating plants, commercial establishments, power stations, and other smaller sources, such as, salvage operations, dry cleaning establishments, etc. Inversion dispersion of pollutants is generally poor. A statistical evaluation of the air pollution situation is included and data are tabulated.

1369

Scorer, R. S.

1955

AN EFFECT OF GAS WASHING AT BATTERSEA POWER STATION. Smokeless Air, v. 26, Autumn 1955: 26-28, illus. DLC (TD884.S885, v. 26)

One of the worst effects of gas washing is cited, and illustrated using the Battersea Power Station (London) as an example. It is stated that gases of the washed plume have a negligible buoyancy and pass away from the chimney top almost horizontally; those of the adjacent untreated plume rise at an angle between 5° and 30° to the horizontal on account of their buoyancy, and probably give rise to no objectionable concentrations anywhere. On account of the evaporation of the liquid water droplets suspended in the washed plume, there is an enormous loss of heat, and the gases acquire a negative buoyancy and begin to descend. Even if it is assumed that sulfur dioxide in amounts produced at a large power station are obnoxious, and that washing to remove 95% of such gases is beneficial, the concentrations of sulfur dioxide which reach the ground close to

the station under the conditions given above are much greater than if no washing had been performed.

1370

Scott, H. J.

1956

PERMITS, REGISTRATION, AND CERTIFICATES OF OPERATION. In Public Health Service (U. S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Sept. 20-21, 1955. p. 61-65. DPH

Permits, registrations, and certificates of operation will furnish an inventory of all the air pollution control equipment under the jurisdiction of an air pollution control unit. One of the major problems is to have an adequately trained staff to cope with the problems encountered. An air pollution control agency must establish reasonable and enforceable limits of emissions for the control of other than smoke and fly ash. Engineering data must be made available from which to evaluate operation of all equipment within its jurisdiction before a nuisance is created. Also, the public must realize that the enforcement officer cannot act as judge and jury and, in addition, enforce regulations

1371

1953

SCRUBBER TRAPS HIGH DUST LOAD. Chem. Eng., v. 60, May 1953: 250. DLC (TN1.M45, v. 60)

The scrubber described offers high efficiency for the control of dust from rotary dryers, cyclones, kilns, roasters, mixers, and pulverizer exhausts as well as from the stacks of asphalt plants, chemical plants, and similar industrial operations. Water use is kept to a maximum of approximately 2 gal/min at 40 to 50 psi for each 1000 cu ft/min of gas. The gas is first subjected to centrifugal action, which removes the larger particles and pre-cools the gas. Directional and velocity control of gas are attained by multiple scrubber throats. Scrubbers are built in various sizes for capacities ranging from 1,500 to 48,000cfm. The assembly is compact and easily moved.

1372

Seamans, F. L.

1956

AIR POLLUTION LEGISLATION. In Air Pollution Handbook. New York, McGraw-Hill Book Co., Inc., 1956. Section 14, p. 14-1 to 14-20. DLC (TD883.M35)

Legal aspects and concepts involved in the problem of air pollution control are presented. These include: (1) the fundamental concepts of pollution control; (2) legal basis for control; (3) present types of legislation; (4) existing state and municipal legislation; (5) future legislation; and (6) recommended legislation. Tables of ordinances and requirements presently enforced in cities of the United States and Canada are presented.

1373

Seamans, F. L.

1957

AIR POLLUTION ABATEMENT HAS ITS LEGAL ASPECTS AND NEEDS INDUSTRY COOPERATION. *Indus. Wastes*, v. 2, Sept.-Oct. 1957: 130-132. DLC

Legal aspects of Air pollution abatement and recommended laws are discussed. Definitions involved in legislation, state vs local control, limitations on emissions, artificial aids to enforcement, and the status of present legislation are discussed.

1374

Seely, B. K.

1952

DETECTION OF MICRON AND SUBMICRON CHLORIDE PARTICLES. *Analyt. Chem.*, v. 24, Mar. 1952: 576-579, illus. DLC (TP1.I615, v. 24)

A method was developed to detect the presence, and to study the concentration of individual chloride particles in the atmosphere, in order to add to the meteorological data concerning the relative origin and behavior of certain air masses. This procedure proved to be capable of detecting and recording the presence of individual chloride particles approximately 0.2 micron in diameter and representing a mass of about 10^{-14} g. This method has been used extensively for the past 3 yr and has produced reliable data. An extremely sensitive microchemical test has been developed which can be applied to other fields of study, and with slight modifications is applicable to the detection of many ions other than chlorides. In most cases, a permanent record is obtained. (Author's abstract)

1375

Seely, W.

1952

OUR AIR IMPROVES. *Air Repair*, v. 2, Aug. 1952: 12-13, illus. DLC (TD883.A48, v. 2)

Constructive efforts to solve the air pollution problem in Cleveland date back to 1946, when the city consolidated its bureaus of industrial hygiene, industrial nuisance and smoke abatement into one centralized organization -- the Division of Air Pollution Control. Simultaneously, the Citizens' Committee on Air Pollution was formed, whose members represent virtually all industrial, commercial, and business interests. Atmospheric conditions in 7 areas were analyzed, showing a 31% decrease in air contamination since 1946, with decline in both total concentration and emission of contaminants from 20-50%, for which three reasons are given: (1) reduction of smoke emission and modernization of firing equipment in city schools, public buildings and institutions; (2) important steps taken by Cleveland industries toward correcting air pollution; and (3) a thorough job of inspection by Cleveland's Division of Air Pollution Control, in particular its Bureau of Smoke Abatement. Recommendations made by the Citizens' Committee are: (1) continued modernization of firing equipment; (2) elimination of the practice of burning rubbish in public incinerators; (3) further efforts by industry to limit more closely and to stop, wherever

economically possible, emission of smoke, fumes, etc.; and (4) expansion of inspection activities by Cleveland's Smoke Abatement Bureau to uncover new areas of additional industrial cooperation. Cleveland has spent \$30 million since 1946 for air pollution control.

1376

SELF-CLEANING COLLECTOR. *Steel*, v. 133, Aug. 31, 1953: 80. DLC (TS300.I745, v. 133)

The Pnagborn Corporation, Hagerstown, Md., has developed a self-cleaning cloth screen-dust collector (type CH-3). The unit permits continuous automatic dust collection, constant air volume and suction, and positive reverse filter cleaning.

1377

Sem, M. O.,

and F. C. Collins.

1955

FUME PROBLEMS IN ELECTRIC SMELTING AND CONTRIBUTIONS TO THEIR SOLUTION. *Jour. Air Pollut. Control Assoc.*, v. 5, Nov. 1955: 157-158, 187, illus. DLC (TD883.A48, v. 5)

In electric smelting furnaces used in the production of carbide and ferro-alloys, the electrochemical processes give a very high thermal efficiency but there is always a tendency toward formation of fumes because of the local, very high temperatures in the arc zones. Many of the common metals and oxides have considerable vapor pressure in the temperature region 2000° - 5000° C, which can explain the fume formation. Most likely, a high proportion of the fume is formed by distillation of metals like Ca, Mg, Mn, Fe, Si, and Al in the arc zones. The furnace gas which ascends through the charge, mainly CO, carries the fumes through the charge bed to the surface of the charge. Here the gas is burned with oxygen from the air in all open top-smelting furnaces and very small particles of oxide fumes are formed. In open furnaces, the burned reaction gas is immediately diluted with enormous quantities of air, and precipitation of the fumes presents serious technical and economic problems due to the very small particle size, surface characteristics of the fumes, low concentration, and large gas volume. In closed furnaces, unburned CO gas is collected below the furnace roof. Presumably the distilled metals react with CO during cooling of the gas, and the metals are reoxidized to the lower oxides, FeO, MnO, and SiO, accompanied by formation of carbon as soot. A majority of smelting furnaces for carbide and ferro-alloys are of the open type, but because of the potential value of the CO gas and the heavy pressure brought by authorities on the plants to overcome air pollution, a gradual changeover to closed furnaces is underway. Many carbide plants in Europe and in the United States of America are operating currently partly-closed and partly-open furnaces. Screened lime is used for the closed furnaces, while the fines, together with lumpy lime, are smelted in the open furnaces with more or less success. The smelting industry is interested in achieving a cheap process for agglomeration or briquet-

ting of fines. Presently all high-grade silicon alloys are produced in open furnaces, because of the high temperature of the furnace top, as well as the necessity for frequent poking in the charge. An experimental FeSi furnace in Norway is mentioned which successfully recovers the CO gas. In this furnace, the gas is collected around the electrode, whereas the main part of the surface of the furnace remains open. (Quoted in part)

1378

- Semrau, K. T. 1957
EMISSION OF FLUORIDES FROM INDUSTRIAL PROCESSES: A REVIEW. Jour. Air Pollut. Control Assoc., v. 7, Aug. 1957: 92-108. DLC (TD683.A48, v. 7)

The principal mechanism of liberation of fluorides in high temperature processes is pyrohydrolysis, which results in the formation of hydrogen fluoride. The principal variables in pyrohydrolysis in most industrial processes appear to be the equilibrium of the reaction, the water vapor concentration in the process atmosphere and the factors determining mass transfer. Significant formation of silicon tetrafluoride appears to be limited to cases involving thermal decomposition of fluoroalicates or reactions of fluorides and silica with acids at relatively low temperatures. Tables are included for fluoride concentrations in process waste gases and fluorine emissions from various industrial processes.

1379

- Septier, L. G. 1957
A PILOT PLANT FOR THE REMOVAL OF IRON OXIDE DUST FROM THE FUMES ARISING IN THE PRE-REFINING OF IRON WITH OXYGEN. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 126. DLC (TD684.S855, v. 28)

The injection of oxygen into liquid pig iron through a lance leads to the emission of copious red fumes in which are suspended dust particles rich in iron oxides which require precipitation. The pilot plant for dust removal installed by I. R. S. I. D. in 1953 at the Mondville works of the Societe Metallurgique de Normandie consists of a dry and wet cleaner in series, the essential feature of the latter being a Venturi scrubber. In industrial use, this installation is able to precipitate more than 99 per cent of the oxide particles contained in the red fumes. Measurement of concentrations of solid particles in the fumes presents a difficult problem on account of the high temperature, and has made it necessary to devise a special apparatus. (Quoted in full)

1380

- Sharrah, J. S. 1955
TYPICAL LEGISLATIVE PROVISIONS. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Sept. 20-21, 1955. p. 90-94. DPH

Some of the early legislative attempts to control smoke which have been tested by court decisions, are discussed. Following the Donora episode and the growing Los Angeles problem, a great deal of legislation regarding control of air pollution sprang up. Later, enabling acts or control acts on a State level were considered, and the first two States to pass such regulations were California in 1947 and Kentucky in 1952. In both instances districts were established in which control agencies could be initiated. In California the county supervisors establish working air pollution control units. The States of Oregon, and New York have established control agencies in their State Health Departments. In Massachusetts, the State Sanitary Engineer Division, is going to assume control. In the State of Washington, the agency housed at the University of Washington had to terminate its free service because of lack of state funds. --- The first step in solving the air pollution problem is an enabling act. Such an act should include only those sections that will define its purpose and establish the agency, prescribing its powers, functions, and duties. Some of these aspects are discussed.

1381

- Shephard, R. J., 1958
G. C. R. Carey, and J. J. Phair.
CRITICAL EVALUATION OF A FILTER-STRIP SMOKE SAMPLER USED IN DOMESTIC PREMISES. Arch. Indus. Health, v. 17, Mar. 1958: 236-251, illus. DLC (TC963.A14, v. 17)

The American Iron and Steel Institute's smoke sampler is 80 to 90% efficient using the Whatman No. 4 filter paper. Changes in particle size (0.2 microns to 0.5 microns) do not affect the efficiency. The main source of variation in sampling rate is a change in the thickness and texture of the filter paper. The air is siphoned through the apparatus by a continuously operating electric pump. The filter paper is arranged in a continuous strip and moved at regular intervals. The density of smoke deposits on the filter paper is measured by photoelectric means. The device can be applied to air sampling in industry and domestic applications, both indoors and outdoors.

1382

- Sherlock, R. H., 1954
and E. J. Leshner.
ATMOSPHERIC SANITATION. Michigan Technic, v. 72, Jan. 1954: 14-15, 34, illus. DLC (TAL.M63, v. 72)

A description of possible measures for the prevention of concentrated gaseous wastes from reaching the ground is presented, based on studies in progress at the University of Michigan since 1934, pioneered under the auspices of the Edison Co. of Chicago. Adverse natural influences that disturb orderly dispersion of stack gases are: (1) aerodynamic influences, (2) unfavorable terrain, (3) meteorological and micro-meteorological influences, and (4) the settling of particulate matter. Such influences may be offset by (1) stack height, (2) gas velocity, and (3) gas temperature. One

group of concrete stacks under construction will have a height of 680 ft. By correlating the wind velocities which are obtained by means of the wind tunnel with the probability of occurrence of critical winds, the number of hours per year during which the plume will be below any fixed height can be computed. Using this height as a starting point, the concentration of constituents downwind can be calculated; it is a function of the quantity of contaminants being emitted, the height of the stack, the wind velocity, the three component coefficients of diffusion, and the point at which the concentration is to be computed.

1383

- Sherman, L. 1952
ON THE SCALAR-VORTICITY AND HORIZONTAL-DIVERGENCE EQUATIONS. *Jour. Meteorol.*, v. 9, Oct. 1952: 359-366. DLC (QC851.A283, v. 9)

It is desirable to treat the horizontal divergence as well as the vertical component of vorticity in reasoning about the wind field. One reason for this is that the vorticity is connected with the intensity of disturbances, the divergence with vertical motion and, hence, weather. Both are synoptically important. Another reason is that, together with boundary conditions and in the absence of discontinuities, these two fields are sufficient to determine the wind field. This co-importance makes desirable an equation for the horizontal divergence comparable to the scalar-vorticity equation. Such an equation is derived in the paper. The physical meanings and orders of magnitude of the various terms of the two equations are discussed. Certain terms of the vorticity equation, ordinarily neglected, are shown to be important. (Author's abstract)

1384

- Shilen, J., 1952
J. S. Sharrah, and C. D. Robson.
THE ROLE OF THE BUREAU OF INDUSTRIAL HYGIENE IN AIR POLLUTION CONTROL IN PENNSYLVANIA. *Air Repair*, v. 2, Aug. 1952: 23-27, illus. DLC (TD883.A48, v. 2)

Although the Bureau of Industrial Hygiene of Pennsylvania was well established for control of air pollution (employing seven district engineering offices) and equipped with industrial hygiene laboratories and a central laboratory, it was felt that a mobile laboratory should be added for on-the-spot analyses. Such a unit, a route-van truck, contains meteorological equipment, including a Bendix-Friez "Aerovane" wind-speed and wind-direction transmitter and recorder modified for versatility and mobility. A second mobile unit carries sampling equipment such as a Thomas-type recorder for SO_2 . Since recorders of this type provide satisfactory analysis of actual conditions, similar equipment is planned for evaluation of other contaminants. An experimental modification of this apparatus will simultaneously record total sulfur and sulfur dioxide content. For sampling of industrial dust and fly ash, shallow aluminum pans (moisture dishes) were mounted on a large shelf-hanger bracket attached to a utility pole, 14

feet above the ground. Wherever practical, mensuration by automatic collecting or recording equipment will be used, based on the premise that air pollution is a 24-hour a day proposition, highly variable from day to day and often from hour to hour.

1385

- 1952
SHOULD SMOKE ORDINANCES EXEMPT BRICK PLANTS?
Air Repair, v. 1, May 1952: 14-16. DLC (TD883.A48, v. 1)

Some manufacturers of brick and pottery products claim that they must use high volatile coal to produce the proper surface effect. The results of an inquiry made by Toronto, Ontario's smoke abatement officer to determine how other cities handled the situation are given. It is reported that many brick plants have successfully converted to fuel oil or natural gas, others employ automatic stokers, and some use low volatile smokeless fuel in attempts to control air pollution. In one instance, a pulverized coal-burning unit was installed in a lime manufacturing plant, the flue gas being passed through a combustion zone to give smokeless flue emissions.

1386

- Sikksna, R. 1955
[SOME CONSTRUCTION DETAILS OF PHOTOELECTRIC CONDENSATION NUCLEI COUNTERS] Einige konstruktive Einzelheiten eines photoelektrischen Kondensationskernzählers. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955, p. 9-20, illus. DGS

Details of the construction of a photoelectric nuclei counter are described. The counter is operated electromagnetically. Special humidifiers are used. The fog formation phenomenon in the absorption tube is discussed. A condenser for sifting the charged nuclei is incorporated, and can be converted simply into a counter for large ions. As an accessory, a camera is provided, allowing the counter to be used as a combination photoelectric and photographic condensation nuclei counter. (Author's abstract in part)

1387

- Silverman, L. 1953
PERFORMANCE OF INERTIAL COLLECTORS. *Heating and Ventilating*, v. 50, Feb. 1953: 87-92. DLC (TH7201.H4, v. 50)

A resumé of the principles involved in the design of inertial collectors used for air pollution control work, is presented. All units operate on the principle that particles in air will settle out due to gravity. The settling rate may be accelerated by using centrifugal force or other mechanisms suitable for the concentration of dust. Several types of inertial collectors are discussed including cyclones, baffle plate types, and a converging jet type. The relative efficiencies of these

units is summarized. Inertial separators have proved valuable for the retention of particles larger than 10 microns. If used for fume or smoke control problems, fine materials will pass through the separators creating a smog.

1388

Silverman, L. 1956
EXPERIMENTAL TEST METHODS. In Air Pollution Handbook. New York, McGraw-Hill Book Co., Inc., 1956. Section 12, p. 12-1 to 12-48, illus.

DLC (TD883.M35)

A discussion is presented of the design, construction, and operation of exposure chambers of both the static and dynamic types; methods of generating gas and vapor concentrations; methods and devices for producing homogeneous and heterogeneous concentrations of solid particles; and methods of generating aerosols containing liquid particles. The problem of metering small liquids and gas flows is considered in connection with generation methods, and the problem of testing air- and gas-cleaning devices by means of dynamic concentrations of various contaminants is outlined. Tables are included.

1389

Sim, V. M., and R. E. Pattie. 1957
EFFECT OF POSSIBLE SMOG IRRITANTS ON HUMAN SUBJECTS. Jour. Amer. Med. Assoc., v. 165, Dec. 14, 1957: 1908-1913. DLC (R15.A48, v. 165)

A number of men were exposed for periods up to 60 minutes to sulfuric acid mist, sulfur dioxide, and various aldehydes. The ill effects of sulfur dioxide gas and sulfuric acid mist in smog can be counteracted by adding ammonia to the atmosphere. The sulfur dioxide gas caused watering eyes, a runny nose, and a highpitched musical rale in the chest while the sulfuric acid mist created these conditions as well as long-lasting symptoms of bronchitis. By adding ammonia to the atmosphere, relief from smog symptoms caused by sulfuric acid mist was almost immediate. The sulfur dioxide gas could also be counteracted in the same way by using either ammonia or by burning magnesium ribbon in the chamber of polluted atmosphere.

1390

Simpson, R. M. 1954
THE ANALYSIS OF FLUE GASES WITH A MODIFIED HALDANE APPARATUS. Chem. and Indus., no. 46, Nov. 13, 1954: 1415-1416, illus. DLC (TP1.S6332, no. 46)

A modified Haldane apparatus for frequent analysis of small samplings of flue gas is discussed. The apparatus was modified from one originally designed for the analysis of mine air, in order to follow changes in the operation conditions as measured by the flue gas in a

new plant producing lampblack from creosote. The modified apparatus is reported to have proved satisfactory and reliable, and to have given results with an accuracy of $\pm 0.02\%$ of the volume of the sample on repeated analyses.

1391

SINGLE-UNIT HOT GAS WASHER. Air Conditioning, Heating, and Ventilating, v. 55, Mar. 1958: 115. DLC (TH7201.H4, v. 55)

A single-unit hot gas washer that resists temperatures up to 2000°F is produced by the Lehigh Fan and Blower Div. of Fuller Co., Catasauqua, Pa. The washer is designed to do away with the need for expensive brick-lined stacks, settling chambers, fans, and gas washing equipment. The unit is less than 15 ft high and can be used for incinerators, melting furnaces, chemical processes, or other conditions where hot air or gas present a dust pollution problem. Manual or automatic sludge removal equipment is available.

1392

Sittenfield, M. 1957
CHEMICAL ENGINEERING ASPECTS OF AIR POLLUTION CONTROL. Chem. Eng. Progr., v. 53, Aug. 1957: 366-370, illus. DLC (TP1.A6, v. 53)

The sources of air pollution considered in this paper are gas evolution from reactors and incidental evaporation of solvents, etc., from storage tanks. Control processes including absorption, extraction, adsorption, and incineration are discussed. When the concentration of a pollutant in the vent gases approaches a value of 2% volume or less, adsorptive methods can remove almost 100% of the contaminant. One of the major uses of adsorption is the recovery of vapors by the use of activated charcoal, activated alumina, or silica gel. Sulfur dioxide can be removed economically as sulfuric acid from gas concentrations as low as 5%.

1393

Slade, F. H. 1954
FOREIGN PARTICLES IN GASES. Machinery Lloyd, v. 26, Sept. 25, 1954: 71, 73-82, illus. DLC (TJ1.M27, v. 26)

The nature of aerosols is described and the theory of particle motion discussed. The principles of cleaning methods commonly used are surveyed, including (1) gravitational, as in settling chambers; (2) sprays, as in air washers and spray towers; (3) inertial, as for centrifugal devices and dust arresters; (4) electrical; (5) filtration by dry, viscous, or bag filters. The standards of rating various types of equipment are outlined, e.g., capacity in cu ft of gas handled per min, percentage of dust arrestance, and reconditioning power of automatic air cleaning devices. A detailed discussion of the applications of air pollution abatement most suitable to the design of each type and the most efficient specification of each type is included.

1394

- Sleeper, W. H. 1957
THREE FLORIDA INCINERATORS. Amer. City, v. 72, June 1957: 138-140. DLC (HT101. A5, v. 72).

The Miami, Fla., incinerator is essentially a power plant using refuse for fuel. It has six 150-ton Nichols Monohearth incinerator furnaces and 6 combustion chambers. Four vertical bent-tube waste-heat boilers, rated at 26,800 lb of steam/hr, generate steam which is sold. The steam boilers help to cool the gases; however, the exhaust gases are cooled further to about 500° F by thermostatically controlled fog sprays. The gases then pass through stainless steel baffles that are washed constantly by water spray to trap fly ash. The fly ash is then discharged into a settling basin where it is removed with the furnace ash. The cleaned gases are drawn off by an induced draft to 2 150-ft steel stacks, lined with fire brick. Structural costs were cut in the Ft. Lauderdale, Fla., plant by making only the charging floor completely enclosed. The plant has a refuse capacity of 250 tons in a 24-hr period. The Coral Gables, Fla., plant must emit only clean stack gas because of nearby residential areas. To remove the odor and fly ash from the stack gas, spray-washed stainless steel baffles are located between the combustion chamber and the 160-ft reinforced concrete, fire-brick lined stack. This incinerator has extra large double-leaf Beaumont Birch charging gates that provide openings 8 ft long and 5 ft wide to permit the feeding of tree trimmings, tree stumps, and dead animals. It uses 2 150-ton Nichols Monohearth units permitting operation to be based on a single 8-hr shift.

1395

- Smith, J. S., and R. Gardenier, Jr. 1953
DETERMINATION OF PARTICLE SIZE DISTRIBUTIONS BY A SEDIMENTATION METHOD. Analyt. Chem., v. 25, Mar. 1953: 577-581, illus. DLC (TP1.1615, v. 25)
A simple apparatus for the determination of particle size distributions as functions of the Stokes' diameter in liquid media is described. A scheme is presented for computing results in such a way that it is not necessary to use Oden's tangential intercept method in routine analyses. The distributions are described in terms of their mean Stokes' diameter and second moments about the mean. (Authors' abstract)

1396

- Smith, M. E., and others. 1957
THE VARIATION OF EFFLUENT CONCENTRATIONS DURING TEMPERATURE INVERSIONS. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 194-197. DLC (TD883. A48, v. 7)
Inversion concentration data obtained at Brookhaven National Lab., Upton, N. Y., from a 335-ft test stack facility are presented and analyzed. The data reveal a pattern of aerodynamic diffusion within the first mile from the source followed by a gradual natural diffusion

process. Accurate prediction of the inversion diffusion concentrations is made difficult by the marked 2-stage nature of the plume behavior. The tracer used is an oil fog consisting of droplets with a radius of approximately 0.3 microns.

1397

- Smith, W. R. 1954
ELIMINATE AIR-POLLUTING SMOKE. Petroleum Processing, v. 9, June 1954: 876-881, illus. DLC (TP690. A1P37, v. 9)

A smokeless, non-polluting flare, built at ground level, is operating successfully at Esso Standard Oil Co., Bayway, N. J. Smoke is eliminated by injecting water into the combustion zone. Construction details, and specifications for the flare are given. This flare burns from 150,000 to 250,000 standard cu ft of gas/hr with no smoke, depending upon the composition of the gas. Illustrations, charts, and diagrams are included.

1398

- SMOG. Jour. Amer. Med. Assoc., v. 153, Dec. 26, 1953: 1566-1567. DLC (R15. A48, v. 153)

The Medical Committee for the County of London (England) has recommended the wearing of gauze masks in cases of smog occurrence. The Ministry of Health (Gt. Brit.) prescribed 2 types of masks to be made available; one having a semirigid frame capable of being molded to the face, and the other being fastened by tapes of a type usually worn by surgeons. Both of these masks incorporate removable pads of thin gauze and cotton tissue. Other practical measures include the use of a scarf or towel. It is stated that a mask or scarf would filter out half to three-quarters of the particles of polluted air. For persons with respiratory diseases who can not tolerate a mask, well-heated rooms are recommended. The method of heating should not entail use of polluted outdoor air.

1399

- SMOG BATTLE CONTINUES IN L. A. Chem. and Eng. News, v. 32, November 1954: 4758-4759. DLC (TP1. C35, v. 32)

At the first semiannual technical conference of the Air Pollution Control Association in Los Angeles, Calif., it was pointed out that research in this area continues at the expense of one million dollars per year. Industry alone has spent \$25 million since 1948. Several catalytic automobile exhaust control devices to be applied on the intake side are under study by the auto industry, promising a 30-50% reduction in unburnt hydrocarbons from exhausts. However, it will take about 5 years until they can be produced on a mass-production scale. Smog is primarily attributed to rubbish burning, automobile exhaust gases, and residual pollution from industry. Refineries have achieved control of evaporation of pollutants from storage tanks, which formerly

emitted up to 100 tons of hydrocarbons into the air daily, by using a vapor balance system as well as floating roofs, in replacement of regular cone roofs. To date 530 barrels of various products are being recovered daily in return of a \$5-million investment for air pollution control. Emissions have dropped from 100 tons to 40 tons per day, and will drop lower.

1400

1957
SMOG FIGHTERS TACKLE THE ORGANIC SOLVENT. Air Conditioning, Heating, and Ventilating, v. 54, Oct. 1957: 87. DLC (TH7201.H4, v. 54)

Organic solvents, entering the air as vapors, are an important contributor to smog production. Such solvents are used in the manufacture of paints, varnishes, glues, printer's inks, cans, tubes, and labels; they are also used in finishing houses, automobiles, and furniture; as well as, in cleaning fabrics and metals. In the vaporized state, they add up to a total of approximately 400 tons per day in the Los Angeles Area. One method of control, which has been successful, recovers solvents by passing the vapors through activated charcoal. Solvent loss can also be controlled by burning vapors either by direct flame or by catalysis. Instruments for measuring solvent recovery devices have not been perfected.

1401

1955
SMOG LOSSES: \$1.5 BILLION YEARLY. Steel, v. 136, Mar. 21, 1955: 76-77. DLC (TS300.I745, v. 136)

W. B. Gibson of the Stanford Research Institute estimated that economic losses caused by air pollution amount to 1.5 billion dollars a year in the U. S. in damage to merchandise and buildings. Kaiser Steel Corporation in Fontana, California, are solving successfully the public relations problem connected with their open-hearth and sinter stack air pollution, by building higher stacks than usual, installing two precipitator units, and by informing the public of future improvements.

1402

1955
SMOG RULE ADDED. Oil and Gas Jour., v. 54, Oct. 17, 1955: 99. DLC (TN860.O4, v. 54)

The Air Pollution Control Board, Calif., has adopted a new rule, effective July 1956, requiring all oil-water separators in the Los Angeles Basin (Calif.) to have one of the following: a cover totally enclosing the liquids; a floating roof; a vapor recovery system; or other equally efficient control equipment. Under a voluntary program, refineries have already reduced hydrocarbon emissions from 95 to 15 tons/day. This regulation does not apply to oil and gas separators in the field.

1403

1954
SMOG SCRAMBLE SPANS NATION. Chem. and Eng. News, v. 32, March 22, 1954: 1108-1113. DLC (TP1.C35, v. 32)

A brief survey is presented on air pollution problems encountered and of control measures initiated in various states and cities in the U.S.A. (New York, San Francisco, Chicago, the Detroit-Windsor area, the Gulf Coast, the southern states, Los Angeles, Oregon, and Washington State), and in England (London). In New York three general indexes of air pollution have been established: (1) soot fall (varying from 30 to 150 tons/square mile/month), (2) levels of carbon monoxide, and (3) levels of sulfur dioxide. One of the main-polluters is the city itself. Politics often hamper pollution control. Chicago is chiefly concerned with dust fall, which was minimal in 1953 with 53.61 tons/square mile. Apartment houses are responsible for 43% of the city's smoke. Multiple air pollution was heavy in Houston, Texas, along the Ship Channel area; later in 1953, 75% of the industrial plants along the Channel were actively taking control measures. Meteorological conditions in this area are very favorable. In Tennessee and South Carolina there is no air pollution control on a state level, but municipal ordinances exist. The Los Angeles district, Calif., battling hot air inversion and high atmospheric oxidant concentration, has been the first to attempt quantitative regulation of contaminants in addition to smoke, soot, and fly ash. Sulfur dioxide contamination has been reduced by a total of 50%, general aerosols by 70 tons, and hydrocarbon evaporation from petroleum plants by 380 tons per day. Yet control is not complete, the internal combustion engine exhaust remaining the first, and hydrocarbon vapors from refineries and back-yard incinerators the second and third major sources of uncontrolled pollution. Some catalytic devices have been suggested, such as attachments to automobile exhausts or catalyzers built into combustion chambers; but none has yet been approved. The University of California School of Medicine is studying the effects of air pollution on health. Oregon is the nation's first state to have a state organization for air pollution control. Problems in the State of Washington have been confined mainly to foliar burn from HF and SO₂; the fluoride problem appears to have been cleared now. In London, England, the domestic fires produce twice as much smoke as industry, with discharge at a lower level. Substitution of smokeless fuels for domestic purposes are advocated. Chemical and other professional associations are now equally engaged in the study of the problem.

1404

1954
SMOG'S LETHAL KISS SCRUTINIZED. Chem. and Eng. News, v. 32, Oct. 4, 1954: 3937-3939. DLC (TP1.C35, v. 32)

Air sampling has revealed the presence of carcinogenic hydrocarbons, including pyrene and benzpyrene. Skin cancers have been produced in black mice with collected air pollution material and with the products of short-chain or cyclic aliphatic compounds. Amino acids, vitamins, hormones, and enzymatic activity could be altered under the influence of artificial smog containing

4 ppm total oxidant (10 times the smog level measured in Los Angeles). Acute morphological changes have occurred in the lungs of rabbits exposed to concentrations of oxidants as low as 10 ppm in smog. The difficulties of experimental evaluation of airborne pollutants for health-harming activity are discussed. An analysis of samples collected at Donora, Pa. (1948) and London (1952) during the lethal smog accidents suggested that death was due to irritation of the respiratory tract by water-soluble fractions of pollution particles below 5-10 microns rather than caused by systemic gas poisoning. The pattern of damage to vegetation seems to be formed only with smog containing ozone and gasoline or automobile exhaust products. It was suggested that gas-phase oxidation of sulfur dioxide by sunlight is probably not effective in reducing visibility. A method for micro-analysis of the acid particles by high velocity impaction upon a photographic film and a light-scattering instrument for measuring submicron particles are described. The procedure for determining particulate fluorides using a platinum tube furnace is given.

1405

SMOKE ALARM UNIT. Instrum. Rev., v. 4, May 1957: 348.

1957
DLC

"This simplified version of a smoke density indicator takes the form of a smoke alarm unit which allows the passage of smoke up to the permitted concentration above which a pair of contacts close, activating an alarm which sounds until the correct combustion conditions are restored. Using this equipment, a permanent record can be obtained of the periods during which excessive smoke concentration has occurred. This unit complies with the details given in the relevant British standard, produced to cover the requirements of the Clean Air Bill [Gt. Brit.]." (Quoted in full)

1406

SMOKE DENSITY CONTROL EQUIPMENT. Instrum. Practice, v. 12, Mar. 1958: 273.

1958

DLC (TA165.158, v. 12)

Two smoke alarm devices for use in checking smoke stack effluents are described. Both units operate on the principle of a photoelectric cell, which converts light into electrical energy. As smoke breaks the light beam, a varying current is emitted by the cell. The two alarms described are suitable for chimneys up to 10 ft diameter and 40 ft diameter respectively.

1407

SMOKE DENSITY INDICATOR. Indus. Wastes, v. 1, Nov.-Dec. 1955: 62A.

1955
DLC

"Standard Instrument Corp., New York, N. Y., has available a data sheet on the Smoke-Eye Smoke-Density Indicator Alarm. The data sheet shows the recording meter and an installation diagram. The test discusses how, as the density of the flue gas varies, the intensity

of the light falling upon the light sensitive cell (placed at opposite sides of the flue passage) is increased or decreased. These changes are then transmitted electronically to the indicator which measures the density of flue gas passing through the boiler." (Quoted in full)

1408

SMOKE DENSITY INDICATOR SYSTEM. Indus. Wastes, v. 1, Nov.-Dec. 1955: 58A, illus.

1955
DLC

The Electronics Corp. of America, Boston, Mass., has announced the [availability of the] Fireye Smoke Density Indicator System FE-3 which makes available to industry a new and more efficient method for keeping smoke discharge within limits of all smoke control and air pollution ordinances. For use with the system, 3 smoke density recorders, Series 55, are available. Fireye System FE-3 consists of a light source, a photoelectric scanner, and a smoke density indicator. Light source and scanner are installed on the stack or breeching so that the light beam is aimed directly at the lens of the scanner. The density of smoke obscuring the light beam is accurately measured and indicated directly on the smoke density indicator in terms of both smoke density and Ringelmann Number. An alarm relay provides for the operation of an external alarm at any preset value of smoke density. One of 3 Series 55 recorders may be used with the new indicator system to make continuous recordings of smoke conditions over a 24-hr period." (Quoted in full)

1409

SMOKE EATERS FOR NINE FIERY FURNACES. Air Repair, v. 2, Feb. 1953: 112-113.

1953

DLC (TD883.A48, v. 2)

U. S. Steel Corp. is equipped with the world's largest installation of electrostatic precipitators. Each of the 9 open hearth furnaces has a pair of precipitators installed as an integral part of its structure. These precipitators are located immediately beside and in a line parallel to the furnace in a system of flues between the furnace and the stack. They are designed to remove more than 95% of the dust normally emitted in open hearth exhausts. A diagram illustrates the furnace-precipitators layout.

1410

SMOKE IN THE PUBLIC HEALTH REPORTS. Smokeless Air, v. 25, Winter 1954: 96-98.

1954

DLC (TD884.S855, v. 25)

Information taken from reports of Medical Officers of Health for 1953 on problems of air pollution in the cities of Liverpool, Manchester, and Sheffield, England is discussed. The general problem of air pollution in the city of Liverpool is stated to be improved during the year, but major improvement will be dependent on the establishment of a smokeless zone in the center of the city, and on the establishment of compulsory powers of prior approval for all plans of fuel-burning equipment.

The survey of areas to be included in an initial smokeless zone was completed during the year; establishment of the zone will require a local act. The question is raised whether the problem of the need for introduction of such an act in the many communities should not be dealt with on a national basis. In Manchester, as in previous years, the principal cause of industrial smoke nuisances was found to be due to unskilled firing. Because of the tightness of the labor supply, this has been hard to control. Where automatic smoke alarms have been installed, no cases of smoke nuisances have been reported. The greater interest of the public in smoke abatement brought about by the creation of a central smokeless zone has resulted in the receipt of a greatly increased number of complaints. In many instances, the "smoke" has been caused by the volatile content of the smokeless fuel or by water vapor produced during combustion. In some instances nuisances have been caused by overloading plants; in these cases special precautions are advised until a new plant can be installed. In general, the success of the initial smokeless zone experiment has been marked. In Sheffield, at the moment, it is not possible to promote a scheme for a smokeless zone since established industrial premises using coal-fired appliances are to be found in the center of the city.

1411

- 1957
SMOKE INDICATORS AND RECORDERS. *Air Conditioning, Heating, and Ventilating*, v. 54, Feb. 1957: 166.
DLC (TH7201.H4, v. 54)

An improved smoke indicator made by the Brooke Engineering Co., Philadelphia, Pa., is described. The unit is operated by a photoelectric cell mounted at the boiler outlet and smoke density is translated into a meter reading at a remote location without any time lag. A hermetically sealed time-delay contact is provided to sound an audible alarm, if desired, a few seconds after the red light comes on, warning the fireman of excessive smoke. The time delay prevents puffs of smoke from sounding the alarm. Two types of indicator-recorders are offered. The violation indicator-recorder records the length of time the smoke has exceeded the set density. The density indicator-recorder continuously records the degree of density from clear to black.

1412

- 1957
SMOKELESS INDUSTRIAL INCINERATOR. *Air Conditioning, Heating, and Ventilating*, v. 54, July 1957: 107.
DLC (TH7201.H4, v. 54)

An industrial incinerator for smokeless disposal of combustible liquid waste materials is available from Preenco Products, Inc., Hazel Park, Mich. Designated the Model SF-1 smoke-free industrial incinerator, the unit is specifically designed to handle liquid paint sludges, thinners, oils, solvents, and any other combustible wastes that can be rendered to a liquid or slurry form. It is adaptable to any viscosity range between air-setting waxy compounds and gasoline. The incinerator provides full combustion at temperatures in excess of 3000°F with no ash in either the retort cham-

ber or effluvia. The high operating temperature contributes to rapid burning rate and high efficiency. Installation cost is reported to be 75 to 80% lower than that of conventional incinerator types. Complete installation consists of the retort mounted on its base, a waste storage tank and a flush-out tank, together with a suitable pumping circuit, pipe, valves and electrical controls. The combined overall height of base and retort is approximately 10 ft. Outside retort diameter is 30 in. Total weight is approximately 4500 lb., including refractory. The incinerator is rated at 1,900,000 Btu per hr. (Quoted in full)

1413

- 1958
SMOKELESS-ODORLESS GAS INCINERATOR IS NEW PRODUCT TO MEET GROWING NEED. *Amer. Gas. Jour.*, v. 185, Apr. 1958: 17, illus.
DLC (TP700.A5, v. 185)

A household incinerator designed to consume food wastes and trash without smoke, odor, or other objectionable by-products is described. The machine is run by an automatic timer and can be started by a simple knob operation. A user may put all the material to be burned into the incinerator at one time, or may put refuse into the incinerator to be burned later. The intensity of the combustion flame and the flow of air are exactly controlled. The benefits to the home owner and the community are discussed.

1414

- 1954
SMOKELESS ZONES. *Jour. Amer. Med. Assoc.*, v. 154, Mar. 6, 1954: 852.
DLC (R18.A48, v. 154)

"Smokeless" zones in Coventry and Manchester, England, have proved to be very satisfactory. In these zones, emissions of the visible and tangible products of incomplete combustion are prohibited; however, such a gas as sulfur dioxide is not controlled. The heating system of the buildings in the zones have been modernized, bituminous coal being replaced by electricity, gas, or coke. After 1 yr, recommendations for increasing the existing zones have been approved.

1415

- 1953
SMOKESCOPE. *Heating and Ventilating*, v. 50, May 1953: 148.
DLC (TH7201.H4, v. 50)

An instrument used for estimating the density of smoke rising from stacks, was described by N. W. Hertz at the spring meeting of the American Society of Mechanical Engineers. The instrument, developed at the Mine Safety Appliance Co., eliminates errors inherent in other methods. In order to expose the reference films and the smoke to the same amount of light, the smoke and film are viewed against the background of the stack. The viewing apertures eliminate stray light. A mirror-lens system enables the viewer to focus the smoke alongside the standardized reference films thus eliminating the error resulting from refocusing when shifting the eye from the smoke to the reference film.

1416

- 1955
SO₂ ABSORBER: TWO SCRUBS BETTER THAN ONE.
 Chem. Eng., v. 62, Feb. 1955: 132, 134, illus.
 DLC (TN1.M45, v. 62)

In order to eliminate objectionable fumes from a sulfuric plant at Pasadena, Tex., a combination scrubbing and stripping unit was devised. A special feature of the unit is its use as a double scrubbing tower which is actually 2 separate scrubbers built one above the other. The first or lower scrubber gives minimum formation of byproduct ammonium sulfite for a given load of SO₂ removed; the second scrubber provides maximum pick-up of the remaining SO₂. The equipment is designed to handle concentrations as high as 0.9%, to cover upsets and the high concentrations on starting up of the plant; the efficiency of the equipment is high with the tail gas containing less than 0.03% sulfur dioxide. This installation allows the scrubber liquor to be disposed of in such a way that stream pollution is avoided and production is increased 20%.

1417

- Soderholm, N.,
 and D. E. Bonn.
 1957
AIR POLLUTION CONTROL OF SMOKEHOUSE EMISSION IN THE PACKING INDUSTRY. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 36-38.
 DLC (TD883.A48, v. 7)

The Luer Packing Co. of Los Angeles, Calif. has installed a type W Roto-Clone wet-type dynamic precipitator, and a low-voltage electrostatic collector capable of handling 12,000 cu ft/min to meet the requirements for effluent emission into the atmosphere. From tests, it was concluded that: (1) this equipment will reduce the opacity of smokehouse effluents to 10% or lower--under most conditions closer to zero capacity; (2) the equipment will remove 95 to 99% by weight of all solid contaminants at exit gas temperatures; and (3) increasing carbon dioxide content by gas-firing methods will give allowable exit concentrations 3 to 4 times greater, although contaminant quantities, properties, and process exhaust volume are of the same order. It is pointed out that the smokehouse emissions must be cleaned to an unusually high degree, and the resultant low carbon dioxide concentrations mean that the level of acceptable solids is 1 to 2% that of the acceptable solid concentration obtained from more conventional combustion processes.

1418

- 1952
OHIO FOGS ITS SMOG. Chem. Eng., v. 59, July 1952: 294, 296.
 DLC (TN1.M45, v. 59)

Standard Oil Company of Ohio, in cooperation with Cleveland's air pollution control program, recently took steps to prevent air pollution from refinery fumes. A scrubber using a high-pressure fog has been installed and is about to go into operation at the No. 2 refinery in Cleveland, to remove fatty acid odors and hydrogen sulphide. Another, similar, scrubber is planned to control sulphur dioxide and sulphuric acid mist in the plant for acid treatment of lube oil. The scrubbers,

known as Fog Filters and manufactured by R. C. Mahon Co., of Detroit, Michigan, were developed principally to remove the less-than-10-micron air contaminants. They are also used for control of sulphuric acid mist, of phosphoric acid, and of phthalic and maleic anhydride. Water as a scrubbing medium completely absorbs fatty acid odors, but was not succeeding in reducing hydrogen sulphide concentration in the air stream; and 8 percent caustic soda solution was successfully used to remove all the hydrogen sulphide even at high concentrations. Cost of the scrubber was \$6,900, cost of the installation \$60,000. The gases pass down the first chamber in a centrifugal motion and then up and out a central tube to the second chamber where they are similarly treated. The scrubbing medium is introduced through a number of fog nozzles placed at an angle around the periphery of the chamber. Centrifugal force throws the contaminants to the outer radial zone of the filter chamber where they are washed down and disposed of. Although the theory of the operation of the scrubber is not definitely known, the major characteristics of the fog system is one of surface effect.

1419

- Solberg, R. A.,
 and D. F. Adams.
 1956
HISTOLOGICAL RESPONSES OF SOME PLANT LEAVES TO HYDROGEN FLUORIDE AND SULFUR DIOXIDE. Amer. Jour. Botany, v. 43, Dec. 1956: 755-759.
 DLC (QK1.B345, v. 43)

Dicotyledonous plants were fumigated with hydrogen fluoride and/or sulfur dioxide, and the results microscopically examined. The histological response to hydrogen fluoride and sulfur dioxide was indistinguishable. The effects of fumigation, responses to different concentrations of the pollutants and various postulates concerning the means and pathways by which a phytotoxic air pollutant may enter the leaf and produce injury are discussed. It is pointed out that fluoride entering the leaf in subphytotoxic concentrations is transported acropetally. When phytotoxic levels are reached, visible marginal injury results.

1420

- 1957
SOME ASPECTS OF SULPHUR RECOVERY FROM INDUSTRIAL GASES IN WESTERN GERMANY. Sulphur, Special Number 1957: 21-25, illus.
 DLC

The Alkazid Process for the removal of hydrogen sulfide and carbon disulfide from industrial gases, carried out at ordinary or high pressure, entails passing gas countercurrently through a bubble-cap scrubber, at the top of which Alkazid lye is introduced at a temperature of 20°C. The lye selectively extracts at least 90% of the hydrogen sulfide present in the gas and only a small percentage of the carbon dioxide. The process used in wet contact sulfuric acid manufacture, based on cleaning acid gases containing 10% hydrogen sulfide or more, is outlined in steps. The Claus process of sulfur recovery is described. The partial combustion of the hydrogen sulfide carried out in the Claus

kiln gives rise to the production of steam. The further reaction of sulfur dioxide with hydrogen sulfide is carried out in two catalytic converter stages. The effluent gas is passed through a final converter where residual hydrogen sulfide is oxidized to sulfur dioxide.

1421

- Speer, E. B. 1957
OPERATION OF ELECTROSTATIC PRECIPITATORS ON O.H. FURNACES AT FAIRLESS WORKS. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). *Smokeless Air*, v. 28, Winter 1957: 125-126.
DLC (TD884.S855, v. 28)

The paper contains information on the electrostatic precipitators on 330-ton basic O.H. furnaces at the Fairless Works of United States Steel Corporation. The furnace system is discussed to indicate the scope of the dust-cleaning problem with respect to volumes, pressures, and temperatures. Modern instrumentation enables the operator to accomplish the steel-making process with good combustion efficiency and minimum furnace damage. The precipitator construction is described by presenting the design features of the chamber, collecting electrode system, discharge electrode insulators, electrical supply units, and safety devices. Dust collection from the precipitator hoppers is performed by a vacuum system with hoppers, piping, primary and secondary collectors, scrubber, exhausters, storage bin and pug mill. Problems and solutions after four years of operation are discussed for possible assistance to other operators. Design conditions of inlet loading, draught losses, outlet loading and efficiency are stated. The testing procedure used to check precipitator performance and the test results obtained are explained. The most serious problems encountered at Fairless have resulted from gas velocity increase and boil-period concentrated loading. Recent and anticipated improvements of major importance to decrease outlet loading by 100 per cent are described as a result of data obtained to date. (Quoted in full)

1422

- Speight, F. Y., 1956
and F. S. Mallette.
STANDARDIZATION ASPECTS OF AIR POLLUTION CONTROL. *Indus. and Eng. Chem.*, v. 48, Sept. 1956: 69A-74A.
DLC (TP1.16, v. 48)

The need for generally acceptable terminology and standardized procedures for sampling and analysis of pollutants is discussed. The standards should be quantitative and objective to assist in defining allowable limits in ordinances and laws and for the uniform presentation of data in air pollution surveys. National organizations concerned with standards, e.g., the American Standards Association are listed, and their objectives and status of reports are discussed.

1423

- Spindt, R. S., 1956
C. L. Wolfe, and D. R. Stevens.
NITROGEN OXIDES, COMBUSTION, AND ENGINE DEPOSITS. (Excerpts from a paper presented at the National Meeting, Fuels and Lubricants Activity, Philadelphia, Pa., Nov. 9, 1955). *Jour. Air Pollut. Control Assoc.*, v. 6, Nov. 1956: 127-133, illus.
DLC (TD883.A48, v. 6)

"Engine deposits generally have been pictured as a result of hydrocarbon oxidation reactions accompanied by polymerization and condensation involving both fuel and lubricant. Evidence is introduced that reactions of unsaturated fuel constituents with oxides of nitrogen formed during combustion, also play an important part in formation of these deposits. Supporting evidence for this hypothesis has been obtained by evaluating the influence of engine operating variables on the fixation of nitrogen, and by experiments devised to show the effect of these oxides on the formation of engine deposits. The paper has 3 appendixes on kinetic calculations of nitrogen fixation; on analysis of nitrogen oxides and the analytical procedure; and on the modifications made on the engine used as the test apparatus." (Quoted in part)

1424

- Spreter, R. P. 1952
AUTOMATIC ASH HANDLING. *Utilization*, v. 6, Oct. 1952: 41-45, illus.
DLC (TP315.U85, v. 6)

The Titus Station of the Metropol Edison Co., near Reading, Penn., decided to collect the fly ash dry in tile silos, and to transfer the furnace-bottom ash wet to dehydrating vats, the so-called hydrobins, through a wet-type hopper. For the original two steam-generating units, two 8,800 cu ft capacity tile dust bins and two 4,400 cu ft hydrobins were installed. Furnace bottom ash is sluiced from the hopper into a transfer sump. The mixture of ash and water is pumped from the transfer sump by two "Hydroseal" ash pumps and the water decanted. Fly ash is collected mechanically at 2 points of each boiler unit. Dust is separated from the transporting air by a vacuum collector mounted on the top of each tile silo; it is then fed into the tile bin, removed from there through a rotary feeder and dustless unloader, and mixed with water. Proper sequencing of the dust handling system is provided by an automatic control unit located in the control room of the power station.

1425

- Stairmand, C. J. 1957
THE PREVENTION OF GRIT AND DUST EMISSION. *Smokeless Air*, v. 28, Autumn 1957: 51-60, illus.
DLC (TD884.S855, v. 28)

The application, efficiency and diagrammatic structure of the following centrifugal dust collectors is presented: (1) the simple cyclone collector integral with an induced draft fan, a long cone cyclone collector, and a

tabular collector. Fabric filters or electrostatic precipitators are necessary for avoiding the emission of smaller particles where discolored plumes must be avoided. Methods of measuring stack emissions are discussed. Tables and illustrations are included.

1426

1954

STATEMENT BY THE MINISTER OF HOUSING AND LOCAL GOVERNMENT TO THE HOUSE OF COMMONS, 2ND DECEMBER, 1953. Smokeless Air, v. 24, Spring 1954: 120-121, illus. DLC (TD884.S855, v. 24)

"After noting that the interim report of the Committee on Air Pollution has been published, some of the findings of the Committee and some of the measures which have been taken to reduce air pollution are discussed. During recent years domestic heating appliances have been developed to burn smokeless fuel efficiently and well. Before the report was submitted, doctors were authorized to prescribe masks under the National Health Service for patients suffering from heart or lung disease or working in an area where smoke-polluted fog is likely to occur. Following the Committee's recommendation, the Government has already arranged for the Meteorological Office (Gt. Brit.) to issue, through the usual channels, warnings when serious fog is expected to prevail for at least 24 hr in areas of normally high pollution. When persistent fog is forecast, it is recommended that: coal fires should not be banked up at night; those who can use smokeless fuels should confine themselves to those fuels during periods of fog; rubbish should not be burned, nor bonfires lit while fog lasts; elderly people and those suffering from chronic heart or lung conditions might be helped by wearing a mask or scarf wrapped round the mouth and nose if they have to go out in the fog; and the general public should refrain from bringing motor vehicles into densely-populated areas. It is especially urged that smoke control measures in industry, shops, offices and hotels should be brought to peak efficiency at once, and checked at frequent intervals throughout the winter." (Quoted in part)

1427

Stead, F. M.

1956

THE FIGHT AGAINST AIR POLLUTION. (Adapted from a presentation at a symposium on "The University and Industrial Society," Los Angeles, Calif., Oct. 26, 1955). Indus. Wastes, v. 1, May-June 1956: 158-161, illus. DLC

Air pollution in Los Angeles, Calif., in 1930 existed, but only to a slight degree, and was almost completely attributable to odors, smoke, and dust. Most sources of objectionable odors or other pollutants were dealt with under the nuisance statutes by local health departments. The pall of soot which hung over large areas from smudging in the orchards was accepted rather philosophically as something that would pass in a day or two. Dust storms and forest fires plagued the area occasionally. By 1940, industries had come into the area and automobile traffic had increased. Odors had diminished, but eye irritation was becoming a major

factor and "smog" came into the vocabulary. By 1955, smog had taken its place alongside water as one of the state's top-ranking problems. It has been reasonably well established that smog is not the sum total of the substances discharged to the air, but is the result of interactions between some of these substances to form new compounds not previously present. These reactions take place between such minute concentrations that a catalyst, such as sunlight, is required. Much additional research is needed to identify these compounds. It is known that the destruction of visibility by smog is caused by the presence of aerosol particles, but the role of aerosols in the effect of polluted air on humans is not fully understood. Additional knowledge is also required of the effects on humans of long exposure to smog, and the maximum permissible concentration of smog ingredients. (Publ. Health Eng. Abstracts, in part, v. 36, Sept. 1956: 1).

1428

Stead, F. M.

1956

STATE-INTERAGENCY RELATIONSHIPS. In Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 98-107. 1956. DPH

A diagram is presented and discussed representing the interrelationships of the following administrative bodies and agencies in the state of California concerned with problems of air pollution: the Legislature, the Governor's Office, the State Office of Civil Defense, the State Department of Public Health, the Local Health Departments, the Air Pollution Control Districts, the Unofficial Agencies, and the University of California. All but one of these agencies are official government agencies. The various activities within each of the agencies are discussed in some detail. Attention is called to the fact that the State Department of Agriculture, the Labor Department, and the Department of Natural Resources, are not included among these agencies at the moment. In the short discussion on implications of setting up an emergency plant with alarms at three levels, it is pointed out that this plan, which had originated locally (especially in Los Angeles County), was not actively participated in by the State Department of Public Health, although that Department thoroughly endorsed the idea and made provisions for its activation and implementation. Furthermore, it was brought out that monitoring of the air does not provide absolute values but merely furnishes a variable index of the effects of air pollution on living things.

1429

Steffens, C.

1956

VISIBILITY AND AIR POLLUTION. In Air Pollution Handbook. New York, McGraw-Hill Book Co., Inc., 1956. Section 6, p. 6-1 to 6-13, illus. DLC (TD883.M35)

This section discussed: (1) transmission of light through a turbid atmosphere; (2) some physiological

problems associated with observations of visual range; (3) interaction of light with suspended particles; (4) methods of observation and measurement of the attenuation coefficient and the visual range; (5) observation and effect of a single source of smoke; and (6) some examples of the relationship between pollution and the other parameters mentioned. Tables, illustrations, and formulas are included.

1430

- [Steinbock, R. S.] 1952
REVISED DATA ON STACK FOR POLLUTION CONTROL. Chem. Eng., v. 59, May 1952: 290.
DLC (TN1.M45, v. 59)

A new chart to replace Figure 4a, and a number of new calculations, are given for Part II of the series of articles by S. R. Steinbock on Stacks for Pollution Control (Chem. Eng., v. 59, Mar. 1952: 144-147), following the discovery of errors in the original article.

1431

- Steinbock, R. S. 1952
STACKS FOR POLLUTION CONTROL. I. Chem. Eng., v. 59, Feb. 1952: 202-203. DLC (TN1.M45, v. 59)

This first of three articles on the height of stacks needed for effective control of pollution by dispersion into the atmosphere, deals with pollution due to gaseous discharge or discharge of gases carrying particles smaller than about 1 micron in size. Although the ideal situation is the total elimination of obnoxious discharges, this is seldom possible or economically feasible. The engineer must solve the problem of designing the stack or chimney to make sure that the residual amount of pollutant which has to be discharged into the air will be dispersed through a wide enough area to prevent excessive ground concentrations. Maximum ground concentration occurs roughly at a distance from the stack of ten times the stack height. It should be noted that some contaminants which may be relatively harmless to humans may still be definitely detrimental to plant growth. The nature of the problem and the permissible concentration must therefore be first determined in each individual case. Several of the formulas used in estimating maximum ground concentrations and variations of concentration, are discussed in the text; three charts are also given relating ground concentrations to distance from the stack or to stack height.

1432

- Steinbock, R. S. 1952
STACKS FOR POLLUTION CONTROL. II. Chem. Eng., v. 59, Mar. 1952: 144-147. DLC (TN1.M45, v. 59)

In continuing with this study of the effects of stack height on the dispersion of gaseous chimney discharges, it is noted that the maximum ground concentration of the pollutant varies inversely as the square of the effective stack height. By "effective stack height" is meant the

actual height of the chimney plus the plume rise. If only an approximate calculation is needed, the plume rise factor may be ignored and the actual stack height may be substituted in the formulas given in Part I of these articles. Some of the factors involved together with the formulas and the steps to be used in calculating plume rise, are discussed in detail; several charts pertinent to the calculations are given.

1433

- Steinbock, R. S. 1952
STACKS FOR POLLUTION CONTROL. III. Chem. Eng., v. 59, Apr. 1952: 154-155. DLC (TN1.M45, v. 59)

This last of three articles on the height of stacks for effective control of air pollution by dispersion into the atmosphere, deals with the emission and scattering of particles. The most serious limitation to the use of the usual industrial precipitating devices is their selective action. When cyclones are used, only large-diameter particles are effectively removed. These would normally have settled out close to the source of their emission, thus leaving the smaller particles as a continuing source of pollution. Since total or nearly total elimination of solid particles from industrial chimneys is economically not feasible, particle dissipation should be attempted over as large an area as possible. The average rate of deposition of solid particles, in tons per year per sq mi, depend on the following factors: (1) rate of dust emission in grams per sec.; (2) fraction of time during which the wind is in the direction of a 45-degree sector under consideration; (3) horizontal distance from the source, in feet; (4) wind velocity in feet per second; (5) free-fall velocity of the particles in feet per sec; (6) the effective height of the stack, in feet; and (7) fraction of the particles which are within given grade limits of particle size in microns. Formulas, together with the chart in Figure 2, are given for the calculation of particle disposition under various conditions.

1434

- Stephens, E. R., 1956
P. L. Hanst, R. C. Doerr, and W. E. Scott.
REACTIONS OF NITROGEN DIOXIDE AND ORGANIC COMPOUNDS IN AIR. Indus. and Eng. Chem., v. 48, Sept. 1956 (Pt. 1); 1498-1504, illus.
DLC (TP1.I6, v. 48)

A mechanism is proposed for the transitory formation of ozone observed when pure nitrogen dioxide in oxygen is irradiated with artificial sunlight. To study the reactions at low concentrations a special combination reaction vessel and a multiple-reflection absorption cell were constructed. Ozone formation was studied at two concentrations of 3 methylheptane and various concentrations of nitrogen dioxide, including some in the range expected in polluted air. The work described indicates that there is an upper limit for the nitrogen dioxide concentration above which detectable amounts of ozone are not produced within a limited irradiation time. This limit is increased by the hydrocarbon concentration. Continued ultraviolet irradiation reduces

the nitrogen dioxide concentration and makes the formation of ozone possible. Ozone will disappear at a moderate rate after ultraviolet irradiation is stopped. Both the peroxide mechanism for ozone formation and the nitrogen dioxide regeneration mechanism are discussed.

1435

- Stephens, E. R., 1958
and R. C. Doerr.
AIR POLLUTION LAB REPORTS FROM LOS ANGELES.
REPORT II. Jour. Franklin Inst., v. 265, Feb. 1958:
148-152. DLC (T1.F8, v. 265)

Results of measurements of pollutants monitored in South Pasadena, Calif., continuously from before the morning traffic rush until well after the evening rush are given graphically and discussed. The general shape of these plots are interpreted in terms of meteorological factors, traffic patterns, and known photochemical reactions. The radiation inversion which results from the night cooling of the earth's surface traps pollutants in this layer of cooler air until the sunlight destroys the inversion layer. Pollution patterns for the test days are given and analysed for four pollutants: (1) hydrocarbons; (2) carbon monoxide; (3) ethylene; (4) acetylene. Formic acid, nitric acid, and methanol, suspected of being present in polluted air, were found to be below the limit of detectability. Aldehydes do not appear to be a major contaminant.

1436

- Stern, A. C., 1952
DESIGN VELOCITY IN INDUSTRIAL EXHAUST SYSTEMS. Amer. Indus. Hyg. Assoc. Quart., v. 13, Sept. 1952: 129-135. DLC (RC963.A135, v. 13)

The methods for computing the most economical velocity for an industrial exhaust system are outlined. A method for computing a system balance ratio is also considered. It is shown that noise is no deterrent to the use of branch-inlet velocities in the 6000 - 10000 ft/min-range and main-discharge velocities in the 3000 - 5000 ft/min-range. "Requirements for maintaining dust transport velocity and abrasive action of high transport velocity are discussed. A general procedure for selecting design velocity is discussed for exhaust systems which handle dust and those which do not." Tables, charts, and equations are included.

1437

- Stern, A. C., 1955
L. A. Chambers, M. Katz, R. Pantaleoni, and A. Goldman.
PUBLIC HEALTH AND AIR POLLUTION. Chem. and Eng. News, v. 33, June 13, 1955: 2496-2499.
DLC (TP1.C35, v. 33)

At the Air Pollution Control Association's 48th annual meeting in Detroit, Mich., A. C. Stern stated that the U. S. Public Health Service has been authorized for the

first time in the present fiscal year to perform studies on the effect of air pollution on human health. L. A. Chambers indicated that the average acetone-soluble fraction of organic particulate matter for the various cities ranged between 10 and 30%. According to M. Katz the toxicity of SO₂, HF and other volatile fluorine compounds and "smog gases" varies considerably. SO₂ is oxidized in plants to sulfates which are non-toxic except when reaching the threshold level. Gaseous fluorine compounds are toxic, affecting mostly the tips and margins of the leaves, causing plasmolysis and degradation of chlorophyll. The handling of radiological wastes is briefly described. For the control of industrial odors, many deodorants have proved effective, as stated by R. Pantaleoni. A. Goldman indicated that it is important to strive for deodorization, rather than substitution of one odor by another.

1438

- Stern, A. C., 1956
AIR POLLUTION PROGRAM OF THE DIVISION OF SANITARY ENGINEERING SERVICES. In Public Health Services (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Proceedings of a Seminar on Air Pollution Problems... Sept. 20-21, 1955. p. 27-38. 1956. DPH

The organizational structures of the Department of Health, Education and Welfare and of the Public Health Service are explained. The Department of Health, Education, and Welfare is the newest of the Federal departments; of its five principal components, the Public Health Service is the oldest having been founded in 1789 and affiliated with the Treasury Department prior to its transfer in 1939 to the Federal Security Agency. The public Health Service consists of four major operating bureaus, under the direction of the Surgeon General: the Office of the Surgeon General, the National Institutes of Health, the Bureau of Medical Services, and the Bureau of State Services. In the seven divisions of the Bureau of State Services, only two operate in fields not directly concerned with air pollution. Two other divisions -- The Division of General Health Services and the Communicable Disease Center -- have a considerable interest in the problem. But it is the remaining three divisions of the Public Health Service Regional Organization -- the Division of Special Health Services, and the Division of Sanitary Engineering Services -- that work actively with states, municipalities, and industry in problems of air pollution. Within the Division of Sanitary Engineering Services, the Robert A. Taft Sanitary Engineering Center in Cincinnati was given the responsibility to develop and administer the Air Pollution Program which was set up soon after the dedication of the Center in April 1954. The Center conducts research and provides technical assistance in the fields of water supply and water pollution, milk and food, radiological health, and air pollution. The Community Air Pollution Program of the Center is divided into five operating units: Chemical Research and Development, Engineering Research and Development, Instrument and Methods Development, Meteorology, and State and Community Services. The various activities of each of the units are discussed in some detail. Other Federal research currently being supported in the field of air pollution is mentioned. The function-

ing of research grants and research contracts to help provide maximum utilization of the research potential of the universities, research agencies, and research institutions, is discussed.

1439

- Stern, A. C. 1956
AIR POLLUTION RESEARCH ACTIVITY (APRIL, 1956).
 In Univ. of Florida. Florida Engineering and Industrial
 Experiment Station, Gainesville. "Atmospheric Pollu-
 tion" ... Bulletin Series no. 83 ..., Sept. 1956, p. 45-
 48. DLC-Sci

This brief discussion of air pollution research activity in the United States includes: expenditures for research; sponsoring organizations; air pollution research organizations; and research emphasis. Tabular data are presented as supplementary material, and a chart is included indicating agencies reporting air pollution research projects (other than cities and individual industries).

1440

- Stern, A. C. 1956
PUBLIC HEALTH SERVICE ENGINEERING PROGRAM ON AIR POLLUTION CONTROL. (Paper presented at the 21st Annual Meeting, Industrial Hygiene Foundation, Pittsburgh, Pa., Nov. 14, 1956). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1956]. 17 p., illus. DLC-Sci

The activities of the Community Air Pollution Program of the Public Health Service (U.S.), authorized by the Federal Air Pollution Research and Technical Assistance Act (Public Law 159), are summarized. The non-medical segment of the program consists generally of training courses, technical assistance in the form of grants-in-aid, state and local studies, and the research program.

1441

- Stern, A. C. 1957
APPLICATION OF ELECTRONIC PROCESSING TO AIR QUALITY DATA. (Paper presented at the Semi-Annual Technical Conference, Air Pollution Control Assoc., San Francisco, Calif., Nov. 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 14 p., illus. DLC-Sci

The paper describes the forms of computed data output and the interpretation of this material in the analysis of air quality sampling data. Applications of electrical computation can facilitate the analysis of annual, monthly, and diurnal tabulations.

1442

- Stern, A. C. 1957
PRESENT STATUS OF ATMOSPHERIC POLLUTION IN THE UNITED STATES. Amer. Jour. Publ. Health, v. 47, Jan. 1957: 78-87, illus. DLC (RA421.A41, v. 47)

The public's attitude toward air pollution is indicated by news stories about local manifestations of air pollution, and by public support of local air pollution control agencies created for the purpose of self-protection. It is pointed out that there is always a close correlation between urban communities and air pollution problem areas. So far, it is stated, few data have been collected concerning the effects of atmospheric pollution on human health and visibility. Tabular data are given on a 20-yr American-Society-for-Testing-Materials study on the atmospheric corrosion of metals (ASTM Special Technical Publication no. 175, June 29, 1955). The data indicate that although much metal corrosion results from pollutants of natural origin, the influence of man-made pollutants is evident. Although air pollution measurements are being made in many areas, only the data on suspended particulate matter is being collected on a uniform basis throughout the United States. Curricula for graduate training in air pollution have been established by 5 universities. A "Cleaner Air Week" has been promoted nationally by the Air Pollution Control Association. It is pointed out that the use of more liquid and gaseous fuels, as compared with solid fuels, has brought about a corresponding shift in emphasis of pollution problems from those involving solid phase emissions to those involving gas or vapor phase emissions; this has caused the partial obsolescence of municipal air pollution control legislation and enforcement practices based solely on the Ringelmann chart and fly-ash emission limits. Three tables in the text give information on support of air pollution research, as of Oct. 1956, indicating the underwriter of the cost of the project, the kind of research organization conducting the research, and the types of study underway.

1443

- Stern, A. C. 1957
RESULTS OF THREE YEARS OF OPERATION OF THE NATIONAL AIR SAMPLING NETWORK. (Paper presented at the Golden Jubilee Meeting, Air Pollution Control Assoc., St. Louis, Mo., June 5, 1957). Public Health Service (U.S.). Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. [1957]. 19 p., illus. DLC-Sci

The progress in analytical procedures and periodical testing during the three years (1953-1956) of operation of the National Air Sampling Network is outlined. Developments in sampling for protein content and organic fractions, and in methods of analysis of inorganic materials is covered. Revisions in the network system have been adapted to obtain a national coverage within existing budget limitations.

1444

- Stern, A. C. 1957
SUMMARY OF THE CONFERENCE ON ODOR CONTROL. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 53-54. DLC (TD883.A48, v. 7)

A combination of weather factors cause most odor complaints in the Cincinnati area to occur between 8:00 p. m. and 2:00 a. m., and again soon after sunrise. The prime odor control method is combustion, such as flare, high temperature furnace, and catalytic combustion. Another method is absorption in a packed tower, spray column, spray chamber, or wet filter, usually having water or an aqueous solution as the absorbent. More than 50% of the air pollution complaints in Cincinnati in 1955 referred to odor. A four-point plan of odor abatement is outlined.

1445

- Stockman, L. 1953
SPECTROGRAPHIC MONITOR FOR INDUSTRIAL ATMOSPHERES: Machinery Lloyd, v. 25, May 9, 1953: 92-95, illus. DLC (TJ1.M27, v. 25)

The Spectrographic Monitor, manufactured by Winston Electronics Ltd., Middlesex, England, is described. The equipment for continuous measurement of atmospheric gas or dust pollution draws the air by a suction pump and passes through a spark gap which excites the line spectra of all the elements present. The element monitored is isolated spectrographically and the spectrogram projected onto a photo-electric cell. The intensity of the spectrographic line is proportional to the concentration of the element. The electric output of the photo-electric cell is amplified and recorded on a moving chart, which can be calibrated according to the concentration of the dangerous element. The equipment is suitable for the measurement of the following elements: antimony, aluminum, beryllium, boron, cadmium, chromium, lead, manganese, silicon, tantalum, zirconium.

1446

- 1953
STOKERS ELIMINATE SMOKE ... IMPROVE PERFORMANCE. Utilization, v. 7, Sept. 1953: 27-29, illus. DLC (TP315.U85, v. 7)

The reduction of smoke and fly ash emissions from the S. S. Sierra and its improved operating efficiency are discussed. This ship, a self-unloading cargo vessel, had been known as one of the "heaviest smokers" in Lake Michigan ports. The change to clean-stack status was brought about by the installation of 6 Scotch marine underfeed stokers in the originally hand-fed boilers. These stokers have resulted in an estimated annual cost reduction of \$34,000, including a savings of \$15,000 on the purchase of firebox chemicals formerly used to control smoke emissions during unloading. In addition, the time required to discharge bulk cargo has been reduced by 21.5%, and no steam pressure failures have occurred.

1447

- Stokinger, H. E. 1953
TOXICOLOGIC PERSPECTIVE IN PLANNING AIR POLLUTION STUDIES. Amer. Jour. Publ. Health, v. 43, June 1953: 742-751. DLC (RA421.A41, v. 43)

"In a consideration of various major disasters from air pollution, it is noted that, although many studies were done, especially in Donora, Pa., the causative agents were never clearly identified. The incidence of deaths was found to be considerably higher in the older-age group especially in those suffering respiratory or circulatory diseases. It has been postulated that death, in this group of people, is caused under normal conditions by an acidosis produced by inability to eliminate carbon dioxide. Under conditions of exposure to irritant gases there is an even greater inability to eliminate carbon dioxide, due to the constricting effect of the gases on the bronchioles, and therefore an even greater tendency to develop acidosis. Because all irritant gases irrespective of chemical nature, act uniformly in this manner, it is difficult to identify specifically any one air pollutant as the causative agent. Also combinations of irritant gases plus other agents are known in some case to increase the toxicity of a single factor, which increases the difficulty of detecting the single offending toxic agent. One instance of long-term effects on community health by a chemical air pollutant has recently been brought to light (Eisenbud, M., and others. "Non-occupational berylliosis." Jour. Indust. Hyg. and Toxicol., v. 31, 1949: 282+). Three tables present a realistic picture of the atmospheric pollutants in some American cities. These show both the character and the amount of: (1) total chemical air pollutants...; (2) 20 of the most prevalent metallic air pollutants from 3 cities' samples and analyzed in a semiquantitative manner; and (3) 8 of the most prominent metallic air pollutants found in 2 large industrial cities. Some toxicological information is also given for the following substances: sulfur dioxide, hydrogen fluoride and fluorine, hydrogen sulfide, nitrogen dioxide, and arsenic and arsine." (Quoted in part)

1448

- Stokinger, H. E. 1957
EVALUATION OF THE HAZARDS OF OZONE AND OXIDES OF NITROGEN. Arch. Indust. Health, v. 15, Mar. 1957: 181-190. DLC (RC963.A14, v. 15)

Experimental evidence is presented that ozone in single acute exposure is a highly toxic substance to laboratory animals. No evidence was found that this toxicity is modified by the presence of nitrogen oxides. Seven factors are discussed that modify the toxicity of ozone. Four of these (physical exertion, youth, alcohol, and respiratory infection) tend to augment the injurious response of the host. The other three (intermittent exposure, pre-medication, and pre-exposure) either reduce or eliminate the injurious effects of ozone. These factors are considered in evaluating hazards to populations from ozone-containing smogs.

1449

- Stokinger, H. E., 1957
W. D. Wagner, and O. J. Dobrogorski.
OZONE TOXICITY STUDIES. Arch. Indus. Health, v. 16, Dec. 1957: 514-522. DLC (TH7201.H14, v. 16)

Chronic injury has been shown to result in the lungs of small animals following repeated inhalation of ozone, a common air pollutant, at concentrations only 2 to 3 times greater than currently reported in urban areas. The injury was characterized pathologically as chronic bronchitis and bronchiolitis. The terminal airways of the animal's lungs were thickened and the air passages narrowed. Fibrosis and, eventually, emphysema developed resulting in lessened capacity to move air in and out of the lungs. Dogs showed none of the extended lung damage observed in smaller animals, but only mild irritation of the trachea and of the major bronchi. Man's relative position in this range of pulmonary response to ozone was judged to be between that of the dog and the smaller animals. This was deduced from calculations involving dimensions of the trachea of the larger air passages and of ventilation rates, and by assuming equal cellular susceptibility of man and dog. Findings with regard to man's response to minor exposures to ozone further substantiate these calculations. Statistical evidence is given that rigorous control of the exposure concentrations was maintained at 1.0 ± 2.5 ppm by volume, as determined by the alkaline potassium iodide method.

1450

- Strachan, J. 1957
THE IMPACT ON INDUSTRY OF THE CLEAN AIR ACT, 1956. Smokeless Air, v. 28, Nov. 1957: 42-45. DLC (TD884.8855, v. 28)

The British Clean Air Act of 1956, stresses the efficient use of fuel as a deterrent to air pollution. Steps to control fuel efficiency include the use of a steam meter for measuring the pounds of steam generated per lb of coal used, and an indicator for recording the amount of air used per lb of fuel consumed.

1451

- Streight, H. R. L. 1958
AIR POLLUTION CONTROL AT A NYLON INTERMEDIATE PLANT. Eng. Jour., v. 41, Jan. 1958: 69-78. DLC (TA1.E584, v. 41)

Air pollution was reduced at the DuPont Co., Maitland, Canada, by designing the boiler house stacks for adequate dispersion of flue gas and by developing an absorption system for almost complete removal of nitrogen oxides in the effluent gases. Results of atmospheric surveys made before and after operation began, showed that concentrations of potential contaminants were low and safe. Threshold limits for sulfur dioxide, for nitrogen oxides, and for ammonia were determined for each compound separately. Two atmospheric surveys showed an increase in dustfall only, but not of sulfur dioxide, of suspended particles, or of organic aerosols.

The estimated maximum sulfur dioxide ground concentrations at various distances downwind from the source, were within the limits set by empirical equations. Critical ground concentration limits at the Maitland plant are 1.0 ppm sulfur dioxide for 1-hr exposures, 10 ppm nitrogen dioxide for durations of up to 8 hr, 8 ppm ammonia for durations of 5 hr.

1452

- Strom, G. H. 1952
WIND-TUNNEL TECHNIQUES USED TO STUDY INFLUENCE OF BUILDING CONFIGURATION ON STACK GAS DISPERSAL. Amer. Indus. Hyg. Assoc. Quart., v. 13, June 1952: 76-80. DLC (RD963.A135, v. 13)

Models have been constructed to study the effect of building configurations on stack gas dispersals. Various chemical smokes are used to study meteorological factors that influence the plume characteristics and dispersal of industrial gases. An accurate correlation between model and full-scale values can often be obtained; however, errors introduced by such factors as the buoyancy characteristics of hot plumes and gas concentrations must also be considered. It is pointed out that wind-tunnel tests are used by industrial designers to determine the best location for stacks, and the most effective stack gas ejection speed.

1453

- Strom, G. H. 1955
WIND-TUNNEL SCALE-MODEL STUDIES OF AIR POLLUTION FROM INDUSTRIAL PLANTS. I. Indus. Wastes, v. 1, Sept.-Oct. 1955: 1-4, illus. DLC

Among the various environmental factors of importance to the dispersal of industrial wastes in the atmosphere are: meteorological characteristics; topography; and sensitivity of surrounding areas to pollution. Among the industrial plant factors are: rate of waste emission; stack gas density and ejection speed; and plant configuration, including stacks. The environmental factors are largely uncontrolled; among the plant factors, however, may be found the solution for an air-pollution problem. Many cases too complex for solution by analytical methods can often be handled with scale-model wind-tunnel investigations. Curves showing the general trend of ground level concentration, as predicted by theory and confirmed by wind-tunnel experiments, have been plotted for reasonably uniform atmospheric conditions. The location and magnitude of maximum concentration is affected by windspeed, atmospheric turbulence, and various plant factors. Stack height is extremely important. Maximum concentration occurs at a downwind distance on the order of 10-stack heights for the case of neutral atmospheric thermal conditions and negligible obstruction effect. Increase in turbulence, whether caused by thermal characteristics of the atmosphere or obstructions on the surface, causes the location of maximum concentration to move closer to the source. For extremely low stacks and unfavorable building configurations, stack gases have been known to envelop lee sides of buildings. The concentration curve shows little or no concentration at low

windspeeds because of a relatively large upward component of motion, which keeps the gas plume clear of the ground. An increase in windspeed causes the plume to deflect toward the ground. (Quoted in part)

1454

- Strom, G. H. 1955
WIND-TUNNEL SCALE-MODEL STUDIES OF AIR POLLUTION FROM INDUSTRIAL PLANTS. II. Indus. Wastes, v. 1, Nov.-Dec. 1955: 55-60. DLC

The use of wind-tunnel scale-model studies of air pollution is discussed. By their utilization, the effect on waste dispersal characteristics of stack gas properties, topographical features, configuration, and some industrial plant thermal characteristics are reproduced effectively. Effects of thermal characteristics of the atmosphere and the earth's surface are not sufficiently well developed to give a manageable result. Essential to the understanding of possibilities and limitations of scale-model experiments is knowledge of applicable scale factors. These are also important to the design and development of a wind tunnel for air-pollution purposes, since they determine the speed range and other important design characteristics. The model should be as nearly as possible a miniature version of the full-scale situation; the similarity must apply to the patterns of air motions and gas plumes, as well as structure and surface features. The requirements of a scale model to produce geometrically correct gas-plume shapes have been expressed by 3 equations. Development of techniques and equipment for investigation of thermal characteristics and their effect on air pollution is in process at New York University (NYU). Results so far appear promising, but have not reached the stage of usefulness for routine investigations of air pollution problems. The NYU wind tunnel, with some of its special features and equipment, is described.

1455

- Strom, G. H., M. Hackman, and E. J. Kaplin. 1957
ATMOSPHERIC DISPERSAL OF INDUSTRIAL STACK GASES DETERMINED BY CONCENTRATION MEASUREMENTS IN SCALE MODEL WIND TUNNEL EXPERIMENTS. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 198-203; discussion, p. 203. DLC

The procedure and considerations necessary for accurate correlation of wind tunnel experiments with field studies are discussed. Scale model experimentation produces more useful results when performed with sulfur dioxide concentration equipment. To study the distribution of sulfur dioxide resulting from stack gases, the wind tunnel provides for control of the following variables: building design, stack design, density of effluent, total effluent gas flow volume, initial sulfur dioxide concentration, wind speed, and wind direction. Diagrams are included. In a discussion of the paper, M. E. Smith and I. A. Singer criticize two factors in the original article concerning the normalization of downwind concentration data and the comparison of these values with the calculated concentrations predicted by the point-source formula presented by Sutton.

1456

- Strom, G. H., M. Hackman, and E. [J.] Kaplin. 1957
ATMOSPHERIC DISPERSAL OF INDUSTRIAL STACK GASES DETERMINED BY CONCENTRATION MEASUREMENTS IN SCALE MODEL WIND TUNNEL EXPERIMENTS: AUTHOR'S CLOSURE. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 203-204. DLC

This is a reply to M. E. Smith's and I. A. Singer's discussion of G. H. Strom's original paper (cf. Air Pollution Bibliography, v. II, Abstract no. 1455). G. H. Strom and the other authors state that stack concentration and rate of emission are not independent unless a special adjustment of other variables is made. Equations are given relating volume concentration ratio with mass concentration and emission rate used in Sutton's formula.

1457

- Studdert, T. C. 1953
FARMER'S LUNG. Brit. Med. Jour., no. 4823, June 13, 1953: 1305-1309. DNLM

A small series of cases of what is recognized clinically and radiologically as "farmer's lung" is discussed. The condition has an acute onset with, usually, spontaneous recovery in about 6-8 weeks. There is a close similarity to coniosporiosis, byssinosis, and diffuse granulomatous pneumonitis. It is theorized that the condition is a nonspecific interstitial lung reaction to some material in fungus-laden dust, rather than a true fungus infection of the lungs.

1458

- SULFUR CHIEF CAUSE OF FOG DEATH. Jour. Amer. Med. Assoc., v. 156, Oct. 23, 1954: 785. DLC (R15. A48, v. 156)

Fatalities resulting from the 1952 London fog were greatest among persons already suffering from chronic respiratory or cardiovascular disorders. 90% of the victims were over 45 yr of age. The excessive mortality and increased incidence of respiratory illness evidently resulted from irritation of the respiratory tract by various constituents in the fog. It is indicated that an increase occurred in the sulfur dioxide in the atmosphere, and in the sulfur trioxide dissolved as sulfuric acid in the fog droplets.

1459

- Sullivan, L. J., and C. B. Willingham. 1957
THE FRACTIONATION OF DUST FALL SAMPLES BY PHYSICAL METHODS. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 50-53. DLC (TD883. A48, v. 7)

Two simple fractionation techniques for the separation of dust particles showing ferromagnetic properties from

mixtures with non-magnetic particles, and also for the separation of non-magnetic particles on the basis of their difference in density are presented. In the magnetic separation, a small Alnico horseshoe magnet is used. Two procedures for the fractionation of dust by the difference in density are used; one based upon gravity separation and the other, a variation of the first, uses a centrifuge to reduce the separation time given. Results of magnetic separations are reproducible to within 2% for samples containing from 1 to 50% magnetics. For fractions obtained by density separation the maximum variation is 2.5%. Tables are included.

1460

SULPHUR-CONTENT DETERMINATION (AUTOMATIC). Instrum. Rev., v. 4, Feb. 1957: 75. DLC

"This equipment ... [is used] for the determination of the sulfur content of oils, greases, tars, and other similar substances. A boat containing the sample is moved down a combustion tube mounted in a special furnace which produces a temperature gradient along the length of the tube. At certain temperatures, the sulfur in the oil burns to sulfur dioxide which is fed to a titration cell. Here detecting electrodes, and a pH millivoltmeter actuate the automatic titrators which control the addition of an iodine reagent from a burette until all of the sulfur dioxide has been absorbed. When equilibrium is reached, the boat is moved again until gas at the next temperature region at which sulfur dioxide is evolved is reached. At the end of the run, total sulfur content can be determined from the total volume of titrant added." (Quoted in part)

1461

SULPHUR DIOXIDE. Gas Jour., v. 293, Jan. 1, 1958: 24. 1958
DLC (TP700.J8, v. 293)

The most promising method of removing sulfur dioxide from flue gas is that of washing with a solution of ammonia salts, to which ammonia is added at a rate corresponding with that of the absorption of the oxide of sulfur. Synthetic ammonia is more satisfactory for this purpose but is more expensive than the crude concentrated liquor of the gas works. Gas liquor is not produced by the gas industry in sufficient amounts to provide for flue gas cleaning in Great Britain.

1462

SULPHUR RECOVERY FROM FLUE GAS. Sulphur, Special Number 1957: 10-11, illus. 1957
DLC

Sulfur recovery from flue gases by the Fulham-Simon-Carves process, which produces saleable ammonium sulfate and elemental sulfur, is discussed. The gases are scrubbed in a closed cyclic system with a solution of ammonium salts, to which is added the appropriate amount of ammonia to react with the sulfur oxides absorbed from the flue gases. The process has been successful in the North Wilford Power Station, Nottingham,

for cleaning the gases produced by the combustion of approximately 7 tons of coal per hr, the sulfur content being in the range of 0.5 to 3.0%. The method adopted to oxidize the various sulfur compounds formed, is by heating the liquor under pressure with a small proportion of sulfuric acid. By this means the ammonium sulfide, bisulphite, and thiosulfate react together to produce sulfate and elemental sulfur.

1463

Sutter, R. C. 1957
RECOVERY OF CHLORINE FROM AIR-CHLORINE MIXTURE. Jour. Air Pollut. Control Assoc., v. 7, May 1957: 30-31. DLC (TD883.A48, v. 7)

A method of recovering chlorine from the waste gases of a chlorine manufacturing plant is described. The process involves the differential absorption of chlorine in carbon tetrachloride followed by the recovery of the chlorine by stripping. The chlorine, recovered as a gas or by the addition of a condenser as a liquid, is returned directly to the main stream of chlorine in the system without further compression or pumping.

1464

Svirbely, J. L., 1957
and B. E. Saltzman.
OZONE TOXICITY AND SUBSTANCES ASSOCIATED WITH ITS PRODUCTION. Arch. Indus. Health, v. 15, Feb. 1957: 111-118. DLC (RC963.A14, v. 15)

Data obtained from acute inhalation studies indicate that ozone per se has a highly toxic effect on rats, mice, and hamsters. The ozone used was generated from various gas mixtures by two different ozonizers varying in current density. Infrared analysis of the scrubbed compressed air used for the toxicity studies indicated no traces of organic impurities. Tests for ozone contaminants, e.g., nitrogen oxides and hydrogen peroxide, failed to reveal significant amounts of these substances. The injurious effects of ozone appear to be lessened by previous exposure to relatively low concentrations of ozone for a brief period. This tolerance was apparent for at least 4 1/2 weeks after exposure.

1465

Swanson, C. G., Jr. 1952
LEONARDO DA VINCI, SMOKE REGULATION ENGINEER. Air Repair, v. 2, Nov. 1952: 26-27, illus. 1952
DLC (TD883.A48, v. 2)

In a short survey article on Da Vinci's achievements it is stated that Leonardo da Vinci "invented" the modern chimney, was the first to record improvements in combustion methods through the use of "space", and formulated the principles of draft. A story related in Merejowski's "Romance of Leonardo da Vinci" reveals by implication Da Vinci's knowledge of the principle of "over-fire air".

- 1466 Tabor, E. C., and W. V. Warren. 1958
DISTRIBUTION OF CERTAIN METALS IN THE ATMOSPHERE OF SOME AMERICAN CITIES. Arch. Indus. Health, v. 17, Feb. 1958: 145-151.
DLC (RC963. A14, v. 17)

Concentrations of 17 metals in the atmospheres of 20 communities have been reported in this paper. Except for antimony, beryllium, cobalt, and molybdenum, these metals were found to be widely distributed, and detectable quantities measured in most communities. Iron, copper, lead, manganese, and zinc particles were found in largest amounts and suitable for statistical evaluation. Barium, bismuth, cadmium, chromium, nickel, tin, titanium, and vanadium were widely distributed, but in quantities considerably under 1 microgram/cu m, which is less than the minimum detectable amount. A variation in maximum levels was found among various communities, with most of the high maxima associated with heavily industrialized areas. An analysis of the distribution of each metal is given. The levels of lead density in the atmosphere has been related to the density of vehicular traffic as well as to the type of fuel used for heat and power.

1467

- Taylor, O. C., E. A. Cardift, J. D. Mersereau, and J. T. Middleton. 1957
SMOG REDUCES SEEDLING GROWTH. California Agriculture, v. 11, Mar. 1957: 9, 12.
DA (100C12cag, v. 11)

The growth of Zutano avocado seedlings was reduced when the plants were exposed to synthetic smog -- a mixture of ozone and hexene vapor. Results suggest that plant food formed by photosynthesis was insufficient for proper expansion of new tissue although new growth was apparently initiated normally. Leaf injury (discoloration) was detected in the treated group of seedlings after approximately two weeks. Chlorosis of the treated seedlings increased progressively as the fumigations continued, indicating that chlorophyll was destroyed. In addition to the reduction in chlorophyll content, the new leaves were noticeably dwarfed; they grew to a size 35% less than that in leaves developed in clean air. The area between the veins was wrinkled or puckered. The symptoms of leaf injury produced are indistinguishable from those caused by natural smog. Oxidant concentration of the polluted air was maintained at about 0.17 parts per million.

1468

- Tebbens, B. D. 1956
AIR SOILING POTENTIAL: AUTOMATIC FILTER SAMPLING. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 233-234, illus. DLC (TD883. A48, v. 5)
"Air samplings, using an automatic smoke sampler, were taken at 2-hr periods almost continuously for 1 yr

at a single outdoor station on the Berkeley campus of the University of California. The sampling station was located on the roof of a 3-story building about 370 ft above sea level, near a street but several 100 yd away from any evident source of smoke. The industrial section of the waterfront was about 3,500 yd west of the sampling station, essentially to the windward during much of the year. The degree of soiling of the filter paper was measured by a light transmission technique. In every month, filter samples from many 2-hr periods were totally free of observable soiling; when smog was in the area, a decided increase in soiling was observed. It was also evident that as the average week progressed from the point of lowest smokiness on Monday morning to that of Friday morning, the increase in daily minimum soiling power was just barely perceptible, while the decrease in the early morning minimum from Friday to Sunday was quite evident. By far the least soiling occurred on Sundays. Since weather patterns are not affected by day of the week, the striking difference in Sunday smokiness as compared with that of other days seems primarily related to air pollution sources. The data, presented primarily for comparative purposes, show that much more elaborate studies of the variations in community activities are required to elucidate the factors in air soiling potential."
(Quoted in part)

1469

- Tebbens, B. D., J. F. Thomas, E. N. Sanborn, and M. Mukai. 1957
HYDROCARBONS SYNTHESIS IN COMBUSTION. II. LIQUID FUELS. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 165-171. DLC (RC963. A135, v. 18)

More than 90 components separable by standard organic procedures and paper chromatography are present in the by-products of incomplete combustion of liquid fuels. These include polynuclear aromatic hydrocarbons and their phenolic and carboxylic derivatives. Some of these are known toxic materials. The general difference between liquid and gaseous fuels in the manner of yielding particulate organic by-products of combustion is that the liquid requires a relatively larger amount of thermal energy to activate the reaction mechanisms. Only one liquid fuel, a low-octane gasoline, produced nitrogenous particulate organic materials.

1470

- Tebbens, B. D., J. F. Thomas, E. N. Sanborn, and M. Mukai. 1958
HYDROCARBON SYNTHESIS IN COMBUSTION. Arch. Indus. Health, v. 17, Feb. 1958: 152-160, illus. DLC (RC963. A14, v. 17)

Data obtained from tests on hydrocarbon synthesis in the combustion of fuels show that incomplete combustion of a wide variety of liquid fuels (saturated and unsaturated aliphatic, cyclic, and aromatic hydrocarbons) can result in the formation of particulate organic material common to a polluted atmosphere. More than 90 components, separable by organic procedures and paper chromatography, are present in the byproducts of in-

complete combustion, including polynuclear aromatic hydrocarbons and their phenolic and carboxylic derivatives. Only one fuel, a low octane gasoline produced nitrogenous particulate organic material. This is thought to result from the presence of nitrogen in the fuel and not from nitrogen fixation from air. Products of incomplete combustion of representative liquid and gaseous fuels are essentially identical.

- 1471 Teichert, F. 1952
[EXPERIMENTS WITH CHEMICAL METHODS OF OZONE MEASUREMENT] Erfahrungen mit chemischen Ozonmessmethoden. Zeitschr. für Meteorol., v. 6, May 1952: 132-138. DLC (QC851.24, v. 6)

A description is presented of quantitative determination of ozone by the methods of Regener, Cauer, or the silica-gel method. The silica-gel method is quite accurate, but too complicated; the ozone content obtained is much higher than that found by Cauer's method. The two other methods, as well as all methods using potassium iodine are simpler, but subject to error in polluted air; because of its practicality, Cauer's method is still being used for current measurements. Ehmert's method of ozone measurement could not be verified. Special heed must be taken of accidental gases occurring in the atmosphere, such as ammonium or hydrogen sulfide, which have a reducing effect on the ozone value.

- 1472 Teichert, F. 1953
[REPORT ON OZONE MEASUREMENT TESTS USING FLUORESCIN] Bericht über Ozonmessversuche mit Fluorescein. Zeitschrift für Meteorologie (Berlin), v. 7, Febr. 1953: 33-34. DLC (QC851.24, v. 7)

Attempts to utilize fluorescein solutions for the measurement of grounded atmospheric ozone have proved of no value as the reaction is too irregular for consideration. Fluorescein can be used, however, for a qualitative ozone check.

- 1473 Terraglio, F. P., J. P. Sheehy, and R. M. Manganello. 1957
RECOMMENDED UNITS OF EXPRESSION FOR AIR POLLUTION. (Paper presented at the Sixth Air Sanitation Technical Conference, Mid-Atlantic States Section of Air Pollution Control Assoc., New York, N. Y., Nov. 20, 1957). [1957]. 11 p. (Mimeographed copy) DLC-Sci

A system of recommended units of expression is presented for use in the air pollution field. Many of the units currently in use are listed together with the recommended unit. One unit of expression has been selected for each parameter. Exclusive use of the metric system units is recommended. The following criteria are listed: (1) use of dimensions actually

measured; (2) units that require no extrapolation; and (3) units as nearly uniform as possible. Fifteen units are suggested for expressing various phenomena, e.g., particle fallout (milligrams per sq. centimeter per time interval), or outdoor airborne particles (micrograms per cubic meter).

- 1474 Tetzlaff, F. 1957
FEDERAL RESEARCH AND TECHNICAL ASSISTANCE IN AIR POLLUTION. (Paper presented at the Annual Meeting of the Industrial Products Finishes Technical Committee of the National Paint, Varnish and Lacquer Assoc. Meeting, New York, N. Y., May 15, 1957). Public Health Service (U.S.). Air Pollution Engineering Program, Washington, D. C., [1957]. 10 p. DLC-Sci

A review of air pollution problems in the U. S. is presented. Provisions are outlined, contained in Public Law 159, authorizing the Public Health Service program of research and technical assistance. Research studies carried on in both Federal and non-Federal organizations are listed. The training grants-in-aid program established by the Public Health Service is discussed.

- 1475 Thelan, E. 1952
TREATMENT OF ODORS AS AIR CONTAMINANTS. Air Repair, v. 1, May 1952: 47-49. DLC

A survey of industrial establishments in the Aramingo district of Philadelphia, Pa., indicated that 25 of the 65 plants considered produced objectionable air contamination. These included contamination by odor, metal fumes, noxious gases, and carbon smoke. Regulatory measures were concerned with the concentration of effluents and the control of the causes of effluent emission. Zoning regulations were enforced, banning offensive practices if alternative arrangements were possible, condemning plants which jeopardized community growth if no solution could be determined, and enforcing regulations upon offending companies. The recommended abatement treatment is given for 18 sources of air pollution in this area.

- 1476 Thomas, F. A., Jr. 1953
EFFECTIVENESS OF THE FOG FILTER. Heating and Ventilating, v. 50, Feb. 1953: 113-115. DLC (TH7201.H4, v. 50)

A fog filter, which utilizes a water spray for the collection of gases, is described. Air is taken into an outer chamber and passed over banks of nozzles, which are spraying water. The clean air is then forced out through a central duct while the contaminant is passed out of the chamber with the liquid effluent. The efficiency of the unit for removing industrial gases is described. The

industrial gases tested include hydrogen sulfide, sulfates, fluorides, carbon dioxide, and chlorine. The unit can also remove dusts, fumes, or mists.

1477

- [Thomas, J. F., 1957
B. D. Tebbens, M. Mukai, and E. N. Sanborn.]
PROBING SMOG. Chem. and Eng. News, v. 35, Dec.
9, 1957: 61-62. DLC (TP1.C35, v. 35)

Announcement is made of the development of a fractional sublimation method which is expected to aid in the analysis of the chemical constituents of smog. The process was developed by a University of California research team whose members were Jerome F. Thomas, Bernard D. Tebbens, Mitsugi Mukai, and Eldon N. Sanborn. Air samples contained in a glass sublimation tube under vacuum, are heated in a special furnace that allows a temperature gradient to be established along the tube. The various components of the air vaporize and then solidify in pure crystalline bands as adjustments in pressure and temperature occur during the process. The tube can then be cut into cylindrical sections and the amount of each substance in the total can be estimated; the pure fraction can also serve as a test substance in studies of carcinogenicity.

1478

- Thomas, J. W. 1958
SAMPLER FOR PARTICLES IN WET GAS STREAMS.
Chem. Eng., v. 65, Feb. 10, 1958: 148, illus.
DLC (TN1.M45, v. 65)

A method of sampling for particles in wet gas streams without condensation or particle loss by a "diffusion tube" is described. The tube consists of a jacket containing an adsorbent which surrounds a pervious section of the sampling tube wall. The process makes use of the difference in diffusion rate between the particles and the water vapor molecules. Particles of 0.1 micron diameter--for most practical purposes the smallest size of interest--have a diffusion constant of about 10^{-5} sq cm/sec, and water vapor has a constant of about 0.2 sq cm/sec. As the gas-particle mixture travels down the tube, the water molecules readily diffuse through the pervious wall, which is a 14-mesh wire screen, and the particles, having a negligible diffusion rate, travel unhindered to the sampler.

1479

- Thomas, M. D. 1956
AIR POLLUTION REVIEW 1954-1955. Ind. and Eng.
Chem., v. 48, Sept. 1956: 1522-1527.
DLC (TP1.I6, v. 48)

A review of air pollution literature published in 1954-1955 is given. Papers on analytical methods and results are discussed under the following headings: oxidants, oxides of nitrogen, carbon compounds, plant injury, reduced sulfur compounds, odors, aerosols,

and chemistry, in Los Angeles smog. A section also reviews the literature on air pollution and health. Ninety-six references are included in the report.

1480

- Thomas, M. D., 1956
and R. H. Hendricks.
EFFECT OF AIR POLLUTION ON PLANTS. In Air
Pollution Handbook. New York, McGraw-Hill Book
Co., Inc., 1956. Section 9, p. 9-1 to 9-14, illus.
DLC (TD883.M35)

In this analysis of the effects of air pollution on plants, the following are considered: (1) sulfur dioxide; (2) hydrogen fluoride; (3) miscellaneous fumigants, e.g., chlorine, ethylene, nitric oxides, etc.; (4) smog, which includes smog-susceptibility and smog composition; and (5) diagnosis of gas damage to plants. Tables of data are included.

1481

- Thomas, M. D., 1958
and others.
PROLONGED EXPOSURE ON GUINEA PIGS TO SULFURIC ACID AEROSOL. Arch. Indus. Health, v. 17,
Jan. 1958: 70-79. DLC (RC963.H14, v. 17)

Guinea pigs were exposed to coarse, medium, and fine sulfuric acid aerosols, in average concentrations up to 4 mg/m^3 , for periods ranging from 18 to 140 days. Some treatments with the fine aerosol averaged 26.5 and 21.2 mg/m^3 for 18 to 45 days. No guinea pig was killed by these treatments, but higher concentrations of aerosol, which accidentally occurred, caused the death within several hours of 21 of the 45 animals exposed. Results are tabulated based on microscopic examinations of sections from the respiratory tract of each animal. Data on acid aerosol concentrations in the field are discussed in relation to those used in the experiment. Tables are included.

1482

- Thompson, O. C., 1956
and G. W. Blum.
SOME NEW ENGINEERING TOOLS AND TECHNIQUES
FOR CLEANER AIR. Chem. Eng. Progr., v. 52, Aug.
1956: 332-336, illus. DLC (TP1.A6, v. 52)

The Subcommittee on Air Pollution of the American Institute of Chemical Engineers has made a survey to determine the availability of new tools and techniques in that field of interest. New tools and techniques were found which employ the latest applications of electronics, tracer elements, light diffraction, and complicated instrumentation. The few which have been singled out for specific reference were selected for their special interest to chemical engineers. The selections are discussed briefly under the 3 broad categories of identification, measurement, and pollution reduction.

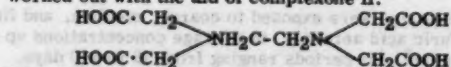
- 1483 **THREE APPROACHES TO ODOR CONTROL.** Heating, Piping and Air Conditioning, v. 24, Jan. 1952: 155. DLC (TH7201.H45, v. 24)

Three approaches to the control of air pollutants from diesel exhaust are recommended. Scrubbing the exhaust will serve to remove the major irritating constituents such as aldehydes. An inhibited sodium sulfate unit has proved effective for this purpose. Absorption by the use of specially impregnated activated carbon will also control odors. Irritating fumes may be oxidized by the use of catalysts. Concentration of odorable or combustible irritants and the exhaust fume temperature is a limiting factor which will influence the choice of methods.

- 1484 **Tockstein, A., and L. Serák.** 1952

POLAROGRAPHIC ESTIMATION OF SULFUR. (Paper presented at the Congress of Practical Polarography, and arranged by the Central Polarographic Institute of Prague, Bratislava, Czechoslovakia, Feb. 18 and 19, 1952). [Abstract]. *Analyt. Chem.*, v. 24, May 1952: 914. DLC (TP1.I615, v. 24)

A polarographic method for estimation of sulfur was worked out with the aid of complexone II:



The sulfur present in the sample is converted to sulfate ion, and isolated as barium sulfate. For the estimation, advantage is taken of the properties of a mixture of free silver ions with an excess of silver complex with ethylene-diamine tetraacetic acid in ammoniacal medium. This mixture yields 2 polarographic waves, the more positive corresponding to the concentration of free silver ions, and the more negative being proportional to the silver complexonate concentration. After barium sulfate is dissolved in an ammoniacal solution of the silver complexonate containing a small amount of free silver ions, the more positive wave increases. This increase of the wave of free silver ions is caused by the formation of the barium complex with ethylenediaminetetraacetic acid, which is stronger than the silver complex, so that an equivalent amount of free silver ions is liberated. Thus, the change of the height of the first wave is proportional to the amount of the barium sulfate dissolved. The applicability of this method was proved on samples of ores and of India rubber with good results. (Authors' abstract)

- 1485 **Todd, G. W., J. T. Middleton, and R. F. Brewer.** 1956
EFFECTS OF AIR POLLUTION. *Calif. Agric.*, v. 10, July 1956: 7-8, 14, illus. DA
Controlled air pollution studies reveal injury to the photosynthetic process, to respiration, and to the per-

meability of membranes enclosing plant cells, induced by air-borne toxicants. Reduced growth and production can occur without leaf necrosis. The results of tests are given and the injurious toxicants, e.g., ozonated hexene, ethylene, and oxidized hydrocarbons, are discussed. Illustrations are included.

- 1486 **TOOLS THAT ALLEVIATE POLLUTION.** *Indus. and Power*, v. 62, Jan. 1952: 78-88, illus. DLC (TJ1.I47, v. 62)

A complete review of the characteristics of air pollution collection equipment is presented. Types of equipment discussed include gravity chambers, inertial separators, packed beds, scrubbers, cloth collectors, electrostatic precipitators, and filters. Included in the evaluations are purchase cost minimum collectible particles and applications.

- 1487 **TOP STRATEGY FOR AIR POLLUTION.** *Chem. and Eng. News*, v. 33, June 20, 1955: 2612-2615. DLC (TP1.C35, v. 33)

A broad federal air pollution research and technical assistance program has been recommended by an ad hoc Interdepartmental Committee on Community Air Pollution, established in 1954 under the leadership of the Secretary of Health, Education, and Welfare. The Committee's report indicates that it will take at least 5 years of sustained effort before major results can be expected, since many data concerning toxic agents and specific irritants are still unknown. Specific problems to be investigated are listed. It is pointed out that many air pollutants now collected and measured may represent but the spent and innocuous end products of reactions between unstable substances, which are the real causes of the damage to living organisms. Knowledge of the chemical substances involved and of the reactions and shifting balances between substances under varying conditions will be a prerequisite for identifying and controlling offensive agents. It is estimated that 25 million dollars will be needed for 5 years of federal research. Industry spends more than \$100 million annually for air pollution control. The Committee reaffirmed the principle of state and local responsibility in the actual control of air pollution. The Government's task is envisioned as that of an organizing, centralizing, and public information agency. The Government will also conduct certain research studies, provide technical assistance to state and local groups, train qualified personnel, arrange for the demonstration of principles and practices involved in control, and make special grants to air pollution control agencies.

- 1488 **Tow, P. S.** 1953
GRAY IRON INDUSTRY PROBLEMS. *Air Repair*, v. 2, May 1953: 128. DLC (TD383.A48, v. 2)

Los Angeles County, Calif., has 2 laws that apply directly to the operation and control of cupola furnaces. Successful methods of effective control of dust and fume emissions from these installations utilize the baghouse and the electrical precipitator. Most companies not having heavy melting requirements have successfully employed gas- or oil-fired reverberatory furnaces to meet the regulations without using control equipment. A table is included that lists the control installations completed or under construction in the iron-foundries in the area.

1489

- Tow, P. S. 1957
CONSIDERATIONS OF THE FEASIBILITY OF CONTROL OF OXIDES OF NITROGEN. Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 234-240.

DLC (TD883.A48, v. 7)

There are no practical methods and no ready solutions for the control of nitrogen oxides as a general atmospheric contaminant. Considerations discussed for the control of nitrogen oxides include: recent work on atmospheric mechanisms, sources of nitrogen, effects of temperature and excess air, absorption and adsorption, and control by vapor phase reactions.

1490

- 1952
TOWER OXIDIZES ODORS AWAY. Chem. Eng., v. 59, Sept. 1952: 232, 234-235. DLC (TNI.M45, v. 59)

A tower for oxidizing, to more stable thiosulphates, the volatile and odorous sulphides in the spent cooking liquor from wood pulping, has been in successful operation at the Weyerhaeuser Timber Company at Springfield, Oregon. The black liquor is pumped from a storage tank to a distributing arrangement on the tile at the top of the tower. Air is forced into the tower at the top and passes out a vent line from a sump at the bottom. The liquor overflows the sump into a second sump, and from there it is returned to a storage tank. About 10 cu ft of air per minute for each gallon per minute of liquor flow, is used. No serious foaming troubles have been encountered and no hydrogen sulphide was found in the air leaving the oxidation tower.

1491

- Turk, A. 1952
H. Sleik, and P. J. Messer.
DETERMINATION OF GASEOUS AIR POLLUTION BY CARBON ABSORPTION. Amer. Indus. Hyg. Assoc. Quart., v. 13, Mar. 1952: 23-28.

DLC (RC963.A135, v. 13)

Activated carbon will absorb petroleum and hydrocarbon vapors, the odors from decomposition and putrefaction, and air-contaminating gases incidental to industrial and chemical processes. For qualitative and quantitative determinations of gaseous contaminants present in low concentration, special collecting apparatus is needed. It must induce a known volume of contaminated

air through a known quantity of granular activated carbon uniformly over a known period of time, recovering the impurity so as to relate the impurity in terms of concentration unit of air. A dual-perforated, activated-carbon-filled, absorption canister, assembled with a motor-driven air blower, fulfilling these requirements is described. The analytical method and procedures for using this collection unit, and the formulas for determining the actual nonaqueous impurity are explained. The sampling rate is 40 cu ft/min, and the air is drawn over the granulated carbon at a linear speed of 25 ft/min. Steam is used to reactivate the carbon and to extract the absorbed impurities. A xylene moisture test is used to determine the water content from steam in deriving the actual degree of atmospheric contamination. Additional qualitative analyses can also be derived using the resultant condensate from the steam reactivation. Tables, diagrams, and formulas are included.

1492

- Turk, A. 1958
OBNOXIOUS ODORS AND HOW TO GET RID OF THEM. Indus. Wastes, v. 3, Jan.-Feb. 1958: 9-14, illus. DLC

Methods of odor control considered include dispersal, combustion, absorption, adsorption (all of which are methods of odorant elimination) and modification (a term which refers to the modification of odor perception, not necessarily of the odorant). The procedure used in each method, the equipment involved, and the developments in each type are discussed.

1493

- Turner, T. H. 1952
DAMAGE TO STRUCTURES BY ATMOSPHERIC POLLUTION. Smokeless Air, v. 23, Autumn 1952: 22-26. DLC (TD884.S855, v. 23)

Softer stones, such as the limestones and dolomites, are attacked more readily by the acids formed by the interaction of industrial smokes (even in small quantities) and rain. Atmospheric pollution also accelerates the corrosion of metals, and of other building materials such as brick, cement, mortar, etc. Washing of public buildings is expensive: during the Festival-of-Britain year at least half-a-million pounds have been spent on it. Fouling and damaging of structures by atmospheric pollution in Sheffield, and at York Minster and Salisbury Cathedral is discussed.

1494

- 1952
\$200,000 MORE FOR SMOKE CONTROL. Air Repair, v. 2, Aug. 1952: 20-21, illus. DLC (TD883.A48, v. 2)

A new type of smoke control equipment, costing \$200,000 has been installed at Consolidated Edison Company's Hell Gate electric generating station in the Bronx. It consists of 64 hollow steel cones, each over 10 ft high, which are installed so that gases emerging

from the boiler will pass through some 2000 slotted perforations changing directions sharply, and thus losing part of the heavy particles. The particles which are small enough to pass through the slots are precipitated by an electrostatic precipitator before reaching the stack. This device, called "Aerodyne", has proven to be efficient.

1495

1956

Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville.

ATMOSPHERIC POLLUTION (PROCEDURES OF THE NINTH FLORIDA MUNICIPAL AND SANITARY ENGINEERING CONFERENCE, APRIL 17 AND 18, 1956). Bulletin Series no. 83 (Engineering Progress at the Univ. of Florida, v. 10, no. 9), Sept. 1956. 59 p., illus. DLC-Sci

Abstracts of papers contained in this report can be found in this volume under the following abstract numbers: 824, 825, 884, 899, 900, 991, 1045, 1137, 1147, 1185, 1439, 1507, and 1512.

1496

1954

AN UNUSUAL TASK: FLUE GAS WASHING TOWER LINED WITH TILES. Chem. Age, v. 70, Mar. 27, 1954: 724. DLC (TP1.C33, v. 70)

At Battersea power station, a 150-ft flue gas washing tower was lined with 95,400 quarry tiles for protection against erosion. The tiles were attached to their concrete base with Semtex bonding cement, containing pure rubber. This mildly extensible cement prevents loss of adhesion by differential expansion. Moreover, a more resistant cement was used between the joints, which were kept narrow and tight. To absorb the sulphur compounds contained in the flue gases (up to 100 million cu ft per hour), 250,000 gal of chalk water are used. Tests have since demonstrated the thorough adhesiveness of the bond of rubber latex and cement.

1497

1955

Updegraff, N. C. HOW TO SELECT EQUIPMENT TO PREVENT SOLUTION CARRYOVER, REMOVE ACCUMULATED SLUDGE, PROVIDE FOR REGENERATION IN GAS PURIFICATION UNITS. Petroleum Processing, v. 10, Sept. 1955: 1396-1399. DLC (TP690.A1P37, v. 10)

This discussion of the Girbotol process (ethanolamine, H₂S, and CO₂ removal) outlines trouble spots occurring in operating installations with suggestions for their solution. The general design and materials for construction of an installation are described, e.g., absorption and reactivation equipment and antifoaming-injection agent. Diagrams are included.

1498

1952

Urone, P. F., and M. L. Druschel. INFRARED DETERMINATION OF CHLORINATED HYDROCARBON VAPORS IN AIR. Analyt. Chem., v. 24, Apr. 1952: 626-630, illus. DLC (TP1.I615, v. 24)

A method has been developed whereby the air is sampled with a cooled scrubbing solvent, and qualitative and quantitative determinations of single or multiple-component vapor-air mixtures are made with an infrared spectrophotometer using a 1.0-mm cell. A chart of the principal peaks of the spectra of 15 chlorinated hydrocarbons is presented, and methods of measuring recorded spectra and preparing standard curves are described. Recoveries averaged 97%, with an average deviation of 6%. As little as 0.04 mg of chlorinated hydrocarbon/ml of sampling solution can be analyzed. By using the proper solvent, the method may be adapted for the determination of the vapors of other organic compounds. (Authors' abstract in part)

1499

1952

UTILIZING OVERFIRE AIR. Indus. and Power, v. 62, Jan. 1952: 91, illus. DLC (TJ1.147, v. 62)

Overfire jets reduce smoke by forcing air into the furnace to aid in the complete combustion of unburned carbon and gases. If excess air is already present, the jets supply turbulence for proper combustion. With modern furnace configuration, jets located about 18 in. above the grate will effectively lower smoke density and provide a low dust loading at the furnace outlet and low carbon loss. Small furnaces yield most effective results when the jets are located from 9 to 12 in. above the grate.

1500

1957

Vacek, A., and A. Schertler. WASTE-GAS CLEANING SYSTEMS AT OXYGEN STEEL PLANTS. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 126-127. DLC (TD884.S855, v. 28)

The required cleaning effect for waste gases at oxygen steel plants can be obtained with either a wet- or a dry-cleaning system, and the only factors influencing the decision in favour of a particular system are local conditions and requirements and, of course, installation and operation costs. Local conditions and requirements may be summarized as (a) availability of water, (b) room on site, (c) governmental regulations, and (d) manner of dust utilization. The installation costs of a dry-cleaning system and of a wet-cleaning system including water recirculation and sludge handling are about equal, but the operating costs will show roughly a ratio of 2:1 in favour of the dry-cleaning system. Allowing a 10-year period of amortization for the cleaning system, including a waste-heat boiler, the gains on waste heat credits are higher than the operation costs plus

amortization factor, and the production costs per ton of steel are therefore lower than they would be without a cleaning system connected with waste-heat utilization. (Abstract modified)

1501

- Van Orman, W. T., and H. A. Endres. 1952
SELF-CHARGING ELECTROSTATIC AIR FILTERS.
Heating, Piping and Air Conditioning, v. 24, Jan. 1952:
157-163. DLC (TH7201.H45, v. 24)

Conventional commercial air filters were compared for filtering efficiency with air filters made of high dielectric plastics, resins, and waxes. In all studies the latter proved more effective. The higher efficiency of these filters is related to the fact that they generate an electrostatic charge when they are exposed to an air stream. This electrostatic charge results in the attraction and retention of fine dust particles. Materials capable of collecting dust by electrostatic attraction include chlorinated rubber, cellulose nitrate, polyethylene, polystyrene, waxes, and resins. The filters are efficient on humid days as well as on dry days. Washing with cold water is sufficient to clean the filter and will not impair its efficiency.

1502

- Verzár, F. 1955
CONTINUOUS RECORD OF ATMOSPHERIC CONDENSATION NUCLEI AND OF THEIR RETENTION IN THE RESPIRATORY TRACT. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955). *Geofisica pura e applicata* (Milano), v. 31, May-Aug. 1955: 183-190, illus. DGS

Mention is made of the long-term study of the concentrations of condensation nuclei in the atmosphere at 4 different locations in Switzerland. The records are being made every 15 min over a period of more than a yr, using an automatic condensation nucleus counter. Using the same type of counter, studies were made with dogs and humans of the respiratory tract retention of condensation nuclei. Experiments on anaesthetized dogs, which were tracheotomized to allow breathing either through the canula straight into the lung or through the nose, showed that more nuclei were retained by the nose (73.6%) than by the lung (60.7%). If the numbers of nuclei were increased by cigarette smoke, the numbers retained by the nose (76.6%) and by lungs (71.1%) were both larger. If the relative humidity in the smoky air was increased to 80-90%, the amounts retained were considerably decreased to 64% and 37%, respectively. Except in the case of extremely toxic material, the biological importance of retention of condensation nuclei (with $r = 10^{-5}$ to 10^{-7}) is not their mass, but the fact that they increase water condensation, or fog formation, inside the respiratory tract. Irritating or toxic substances which are in the atmosphere in subthreshold concentrations may thus be concentrated within the respiratory tract. An increase of the number of atmospheric condensation nuclei may be of importance also in fog formation in the outside air.

- 1503
Viets, F. H. 1952
ATMOSPHERIC SANITATION IN LOS ANGELES COUNTY. Heating and Ventilating, v. 49, Feb. 1952: 86-89. DLC (TH7201.H4, v. 49)

Antismoke legislation in Los Angeles County, Calif., requires the recovery of from 85 to 93% of the particulate matter being emitted into the atmosphere. Pollution sources in the area and means of controlling them are considered. Wet scrubbers and washers and centrifugal devices are not satisfactory for the filtration of effluents from the gray iron foundries. Of 58 local foundries, 15 now use reverberator furnaces, one uses an electric furnace, and the others are installing bag collectors preceded by gas coolers. In the coffee-roasting industry, a process of heating the effluent gases to a point where all carbonaceous and odoriferous materials are burned has been adopted. A better process control has eliminated much of the odor problem in the fish-processing industry. The nonferrous foundry industry has adopted bag collectors, and the steel plants electrostatic precipitators. Nearly a million backyard incinerators, however, continue to contribute approximately 90 tons daily of aerosols and a like amount of gases such as aldehydes, nitrogen oxides, and organic acids to the atmospheric pollution of the area.

1504

- Vlcek, J. G., and R. A. Graff. 1953
GLOBE SOLVES PRESSING AIR POLLUTION PROBLEM WITH NEW TYPE SULFUR-RECOVERY UNIT. Oil and Gas Jour., v. 52, July 6, 1953: 64-65, 98-99. DLC (TN860.O4, v. 52)

Globe Oil and Refinery Co., Lemont, Ill., has designed a sulfur-recovery unit having a daily capacity of approximately 13 tons of sulfur. The process involves the conversion of hydrogen sulfide to elemental sulfur in 2 steps. The hydrogen sulfide - carbon dioxide gas mixture from the desulfurization unit is divided into 2 streams, a one-third portion being burned in the fire-box of the steam boiler with air to produce sulfur dioxide. The sulfur dioxide is then mixed with the remaining two-thirds-portion of the acid-gas stream to form elemental sulfur and water vapor. The reacted vapors are cooled, the sulfur removed, and then reheated by a second-stage catalytic converter for a final reaction of the unconverted hydrogen sulfide and sulfur dioxide. The waste gases, consisting largely of nitrogen, water vapor, carbon dioxide, and traces of hydrogen sulfide and sulfur dioxide, are then discharged into the atmosphere at the vent stack located on top of the sulfur condenser-scrubber. A scale model, and a chart of the material in the sulfur-recovery unit are included.

1505

- Vocci, F. J., and others. 1956
AN APPARATUS FOR QUANTITATIVE STUDIES OF

INHALED AEROSOL BY DOSIMETRIC PROCEDURE.
 Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 69-71, illus.
 DLC (TD883.A48, v. 6)

An apparatus for the determination of retained doses of aerosols in the respiratory tract of dogs is illustrated. It consists of a 200-liter dispersion chamber, a mask with 2 valves through which the dog inspires and exhales, a dry test meter, and a 120-liter gasometer. Graphs, using test data, are given.

1506

Vonnegut, B., and R. L. Neubauer. 1953
COUNTING SODIUM-CONTAINING PARTICLES IN THE ATMOSPHERE BY THEIR SPECTRAL EMISSION IN A HYDROGEN FLAME. Bull. Amer. Meteorol. Soc., v. 34, Apr. 1953: 163-169, illus.
 DLC (QC851.A6, v. 34)

An apparatus has been constructed that detects and counts aerosol particles by the pulses of light they produce when they enter a hydrogen flame. Continuous observations, made over a period of 7 months, show that the concentration of large sodium-containing particles in the atmosphere is subject to large fluctuations. No consistent correlations have been observed between the concentration of these particles and other meteorological variables. It appears that the particles being counted originate not only from ocean spray, but also from dust storms and as a result of human activity. (Authors' abstract)

1507

Wakefield, J. W., and E. P. Bisher. 1956
AIR POLLUTION CONTROL AND ITS EFFECTS ON OTHER ENGINEERING ACTIVITIES. In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution"... Bulletin Series no. 83..., Sept. 1956. p. 8-10. DLC-Sci

All phases of sanitary engineering are interconnected and interdependent; this applies particularly to air and water pollution. For instance, the pulp and paper industry's development of the Kraft process in the South has lessened stream pollution by recovering spent chemicals from process water. However, this advantage was offset by the formation of mercaptans and hydrogen sulfide gases in the recovery process, some of which are driven off into the stack in the recovery process. Thus, the decrease in water pollution resulted into an additional air pollution problem. --- Air and water pollution can result from fluorosilicic acid, the by-product formed when phosphate rock is treated with phosphoric or sulphuric acid. Fluorosilicic acid can be washed out of the processed phosphate and thus becomes a potential water pollutant. The remaining fluorosilicates go with the phosphate to dryers and are driven off in droplets or as a gas. As such, they become potential air pollutants. The utilization of stack washes can reduce air pollution, but result in a water pollution problem. The phosphate rock processors are

aware of these problems and improvements have been noted in several streams in recent months. Much research has been initiated and the companies are investing large sums of money to control both air and water pollution.

1508

Walker, R. L. 1952
HOW NASHVILLE HANDLES VIOLATORS. Air Repair, v. 1, May 1952: 41-42. DLC (TD883.A48, v. 1)

The Nashville (Tenn.) Division of Smoke Regulation has accepted most of the standards of the Technical Manual of the Stoker Manufacturers' Association with regard to the minimum setting heights, combustion volume, and hearth area. The Nashville regulations require a system for overfire air to eliminate off-period smoke, 1 cu. ft. of combustion volume/4 lb. of coal, and either automatic or barometric dampers and hold-fire timers wired to maintain a fire during idle periods. A standardized procedure has been developed to be used by stokersmen in igniting fires capable of causing heavy smoke. The division makes annual inspections in all plants serving commercial and industrial buildings.

1509

Waller, R. E., and P. J. Lawther. 1955
SOME OBSERVATIONS ON LONDON FOG. Brit. Med. Jour., no. 4952, Dec. 3, 1955: 1356-1358, illus.
 DNLM

On Jan. 19, 1955, visibility in London was greatly reduced by smoke in the absence of fog. On that date, wide variations in the concentration of smoke were observed with a tenfold increase occurring over a period of 2 hr. There was also an increase in sulfur dioxide, but no sulfuric acid was detected by the methods used, although some minute droplets may have been present. Parallel clinical studies indicated that there was some temporary deterioration of the clinical condition of patients with emphysema and chronic bronchitis during this increase in smoke pollution. The results lay emphasis on the fact that 24- or 48-hr period averages do not necessarily indicate the degree of hazard.

1510

Waller, R. E., and P. J. Lawther. 1957
FURTHER OBSERVATIONS ON LONDON FOG. Brit. Med. Jour. no. 5059, Dec. 21, 1957: 1473-1475.
 DLC (R31.B93)

A group of 180 patients in the Greater-London area suffering from chronic bronchitis and emphysema was observed, and a close correlation was found between these clinical conditions and the concentration of atmospheric pollution in the city. Daily measurements were made of smoke and sulfur dioxide in the air of central London. In general, the patients' condition began to deteriorate

when the concentration of smoke rose and visibility was reduced. The concentration of sulfur dioxide and sulfuric acid rose with that of the smoke and was thought to be partly responsible for the effects observed on the patients.

1511

- Walter, L. 1954
MEASUREMENT OF FLUE GAS COMPOSITION. Utilization, v. 8, Jan. 1954: 33-36.

DLC (TP315.U85, v. 8)

The methods used for flue gas analysis are reviewed including: chemical liquid absorption (Orsat method); chemical solid absorption; an electrical method using thermal conductivity of gases; and electrical methods using density of gases. Additional information is given concerning chemical types of gas analyzers and electrical methods of gas analysis. Diagrams showing arrangements of various recording instruments are also presented.

1512

- Wander, I. W. 1956
EFFECTS OF POLLUTANTS ON VEGETATION (WITH SPECIAL REFERENCE TO THE EFFECT OF FLUORINE ON CITRUS). In Univ. of Florida. Florida Engineering and Industrial Experiment Station, Gainesville. "Atmospheric Pollution"... Bulletin Series no. 83..., Sept. 1956, p. 14-16.

DLC-Sci

A review of the literature indicates that the earliest work, done by Germans, recognized that the gaseous components of smoke and not the solids were the actual agents causing injury to plants. Of all the gases effective in causing plant damage in the United States, sulfur dioxide has been studied to the greatest extent. It has been shown that toxic concentrations of sulfur dioxide were much lower than had been previously suspected. Several other studies on the susceptibility of certain species to sulfur dioxide injury are reviewed. The actual method by which gases injure vegetation is not known. Environmental conditions will enhance or decrease susceptibility of plants to damage by gases at the same concentration. There is very little literature on damage to tropical or subtropical plants by air pollution. A chlorotic condition of citrus trees in the Bartow area of Polk County, Florida, which was noted in April 1950, differed from known chloroses resulting from nutritional deficiencies or from the presence of plants which released fluorine in the production of triple-superphosphate. A similar chlorotic pattern, noted in the Lake and Highlands area, resulted from the same condition. However, tests determined that chlorosis was not in all cases associated with an unusually high fluorine content. Differences in climatic conditions is the explanation given for chlorosis appearing in Florida, but not in California.

1513

- Wanta, R. C., 1957
and A. C. Stern.
CLASSIFICATION OF AIR POLLUTION EXPOSURES. Amer. Indus. Hyg. Assoc. Quart., v. 18, June 1957: 156-160.
DLC (RC963.A135, v. 18)

A method of classification of air pollution conditions employing the interaction of the effects of concentration, "characteristic time scale" (average period), and recurrency is presented. Application is made to air pollution incidents. It is suggested that research efforts employing this triad be intensified in order to improve our ability to access the kind of air environment toward which communities are now tending. It is expected that short-term methods of assessing long-term effects will eventually become successful.

1514

- Warren, R. P. 1952
EQUIPMENT FOR INDUSTRIAL VENTILATION AND AIR POLLUTION CONTROL. Heating, Piping and Air Conditioning, v. 24, May 1952: 125-127.
DLC (TH7201.H45, v. 24)

The principal systems used for industrial ventilation and air cleaning are described. These include electrostatic dust collectors, cloth collectors, wet and centrifugal collectors. The author cites the fact that a good, uniform view of what constitutes air contamination, is lacking. This, he maintains, makes the job of air pollution control more difficult.

1515

- Warren, R. P. 1952
INDUSTRIAL ATMOSPHERE SYMPOSIUM. II. EQUIPMENT FOR INDUSTRIAL VENTILATION AND AIR POLLUTION CONTROL. Heating, Piping, and Air Conditioning, v. 24, May 1952: 125-127.
DLC (TH7201.H45, v. 24)

Mechanical equipment for general ventilation and local exhaust ventilation is discussed. The basic requirements necessary to meet the users' needs are reviewed. Electrostatic precipitators, fabric collectors, settling chambers, and sonic agglomerators are described. It is concluded that the establishment of limits for contaminants is essential for the development of air-cleaning equipment.

1516

- Watson, H. H. 1952
SIMPLIFIED EYE-PIECE GRATICULE FOR ASSESSING THERMAL PRECIPITATOR DUST SAMPLES. Brit. Jour. Indus. Med., v. 9, Jan. 1952: 80-82.
DLC (RC963.A23, v. 9)

A method is described for the microscopic counting and sizing of dust particles obtained by thermal precipita-

tion using an eye-piece graticule. The graticule can be utilized in the eye piece of an ordinary microscope, and also on the screen of a Vicker's projection microscope. An explanation of both applications is given, and diagrams are included.

1517

Watson, H. H.

1953

DUST SAMPLING TO SIMULATE THE HUMAN LUNG.
Brit. Jour. Indus. Med., v. 10, Apr. 1953: 93-100,
illus. DLC (RC963.A23, v. 10)

An examination is made of the possibilities of designing a dust-sampling instrument to give directly an index of concentration proportional to the amount of dust likely to be deposited in the lung. Such deposition will depend, among other things, on the size distribution of the dust particles in the cloud being breathed, and on their density and shape. The aerodynamic diameter of a particle is the correct measure of its size in this context, and results are given for a number of dusts of the relation between this and the mean projected diameter as determined with a microscope. Lung deposition vs particle size curves are derived for a number of natural dusts. These are compared with the curves of penetration of dust through some selector devices which trap the larger particles, leaving the smaller ones to pass through to constitute the sample. The results obtained strongly suggest that it is possible to use with confidence selective sampling devices which satisfactorily simulate the upper passages of the human respiratory system, and will allow to pass to a suitable depositing element a sample from which can be derived directly a measure of the concentration of the respirable fraction of a dust. This sample will give a comparable index of concentration which is almost independent of the dust, its size distribution, density, and particle shape. (Author's abstract)

1518

1952

WE DON'T HAVE ALL THE ANSWERS. HOW THE TEXAS STATE DEPARTMENT OF HEALTH TACKLED A STUBBORN AIR POLLUTION CONDITION. Air Repair, v. 2, Nov. 1952: 52-58, illus. DLC (TD883.A48, v. 2)

Two public hearings on air pollution problems were held in Houston, Texas, in June and August 1952, one for the citizens, the other for representatives of industry to present their cases. A series of excerpts are presented from testimonies of representatives of firms in the Ship Channel area, in reply to complaints from the public. These testimonies relate briefly the efforts made to control air pollution and the improvement achieved. A number of them, such as the Mathieson Chemical Corporation, the Diamond Alkali Company and others, stress the difficulty of the problem for their industries. Despite extensive expenditures for new installations and research, the systems are not perfect and air pollution occurs, the causes being difficult to find. They will nevertheless continue investigation, in order to reduce pollution to a minimum.

1519

Weart, H. W.

1955

SMALL CUPOLA SPORTS NEW BONNET. Modern Castings and Amer. Foundryman, v. 28, Oct. 1955: 37-38, illus. DLC (TS200.A7527, v. 28)

An enclosed, water-cooled bonnet costing \$300 was designed and installed to cool cupola exhaust gases and to prevent both hot gases and sparks from creating a fire hazard and a nuisance at a foundry on the University of Wisconsin campus. The installation is unique in that it is completely within the foundry which has a ceiling height of only 18 ft directly over the cupola. With the closing of the charging door by a close-fitting sheet steel panel, the cupola becomes essentially a closed system except during actual addition of a charge.

1520

Weatherup, W. J.

1954

THE MUSGRAVE AERODYNAMIC DUST COLLECTOR. Heating and Air Treatment Eng., v. 17, Feb. 1954: 32-35. DLC (TH7201.A4, v. 15)

The Musgrave Aerodynamic Dust Collector produces and utilizes aerodynamic forces to separate dust particles from a stream of air or gas. The simplest type of this collector, a single stage with a single cone, is suitable for a volume of 500 cu ft, and the largest collector for 10,000 cu ft of air per min. The all-metal construction of the collector enables collection from gases at high temperatures.

1521

Weaver, E. R.,
and others.

1957

INTERPRETATION OF MASS SPECTRA OF CONDENSATES FROM URBAN ATMOSPHERES. Journal of Research (National Bureau of Standards, Washington), v. 59, Dec. 1957: 383-404. DLC (QC1.U52, v. 59)

A method of interpreting the mass spectra of the very complex mixtures of substances that condense from an urban atmosphere at the temperature of liquid oxygen is described. The number of individual chemical compounds in such a mixture is greatly in excess of the number of masses recorded, and it is accordingly impossible to identify all the components present. However, the significant sources of pollutants are much less numerous, and if the products from each source are of substantially constant composition it is possible to obtain a representative pattern of each and to proceed thereafter to make a fairly good estimate of the character and amount of pollutants in terms of their sources. The greatest simplification is made by treating the gas associated with motor traffic as a unit. (Authors' abstract)

1522

- Weber, H. J. 1957
METHOD OF COMBATTING AIR POLLUTION IN FERROUS AND NON-FERROUS FOUNDRIES. (Paper presented at the 50th Annual Meeting of the Air Pollution Control Association, held at St. Louis, Mo., June 2-6, 1957). Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 178-181. DLC (TD883.A48, v. 7)

The foundry industry has been a pioneer in the control of air pollution. Shakeout, cleaning room, and pattern-making operations have now been controlled. Melting operations have presented an entirely new set of problems because of heat and corrosive gases. In attempts to control these operations, some basic operational changes are outlined, and collection equipment of various degrees of efficiency is being considered. Of these the following are discussed: a simple spray washer, an improved cupola gas washer with cone, dry mechanical or centrifugal collectors, high-efficiency centrifuge, fabric filter collectors, electrostatic precipitators, and other types of equipment. Also discussed are control equipment for furnaces, the phosphorizing of copper, and inoculation of iron with magnesium.

1523

- Weller, E. F. 1954
ACOUSTIC APPARATUS FOR DETERMINATION OF MIXTURE RATIO BY ANALYSIS OF ENGINE EXHAUST GAS. Analyt. Chem., v. 26, Mar. 1954: 488-491, illus. DLC (TP1.1615, v. 26)

A mixture ratio analyzer was developed to provide a fast and accurate means of indicating or recording the air-fuel ratio in internal combustion engines. The analyzer converts the raw engine exhaust gas to a 2-gas mixture plus water vapor by the use of an oxidation furnace. The water vapor is held to a constant low value, and the resultant binary mixture is analyzed in an acoustic chamber. The acoustic gas analyzer operates by measuring the velocity of sound in the gas using a simple feedback circuit in which the acoustic chamber is the frequency controlling element. A frequency discriminator converts the signal to a direct current voltage which is a function of the gas composition. The analyzer will indicate or record mixture ratios with an error of $\pm 1\%$; the drift is 1% in 24 hr. The accuracy achieved with this unit is comparable to the accuracy obtained with more elaborate equipment, while the response time is considerably shorter. In this application, the analyzer is more accurate and does not have the inherent errors found in the Orsat [apparatus], and therefore it is more accurate than devices depending on the Orsat for dynamic calibration. (Author's abstract)

1524

- Wells, T. J. 1952
HOW THE SUPERINTENDENTS' COMMITTEE OF GREATER CINCINNATI REDUCES SOME VIOLATIONS. Air Repair, v. 1, May 1952: 23-25, illus. DLC

In 1926 the responsibility for smoke reduction in Cincinnati was placed in the hands of the railroads. Smoke violations observed by the city inspectors would be sent to the supervisor of locomotive operation, who would handle the matter with the respective railroad company. The railroads made it their aim to reduce the violations in accordance with the demands made by the city inspectors. The management made it mandatory that every supervisor teach his own men to handle engines without the emission of objectionable smoke. The Cincinnati terminal is the only railroad center that has a chief supervisor of locomotive operations. All violations pass through his office to the particular supervisor responsible, and the handling is returned to him for disposition. Today any excessive smoke reported by anyone anywhere in the terminal is promptly investigated, and proper discipline administered. The supervisor of locomotive operation rides with the firemen, and teaches them the "horsehoe" banking procedure which is the only solution to steam engine smoke control in yard and transfer service. Fires are checked on ready tracks and at receiving tracks, as it is believed that poor fires on these tracks are the chief cause of violations and should be charged to the persons operating the engine. The mechanical departments maintain the locomotives in excellent condition, and immediately repair the defects reported. Quarterly meetings are held between the Superintendents' Committee and the Chief City Smoke Inspector and his efficient staff. With the help of all the men on the railroads, an excellent record of smoke control has been established.

1525

- Went, F. W. 1958
PLANT DAMAGE DUE TO AIR POLLUTION AND THE USE OF PLANTS AS INDICATORS OF AIR POLLUTION. APCA News, v. 6, Jan. 1958: 3-5. DLC

Advantages of using plants as indicators of air pollution, as far as gaseous impurities are concerned, are discussed. Available data indicate that, whenever the consumption of gasoline in a sufficiently large area surpasses 12 tons/sq mi/day, smog damage can be expected on days when meteorological conditions are unfavorable. Smog of low concentration causes the stomata of plants to close, which reduces the total water loss by transpiration. Higher concentrations will cause breakdown of the semipermeability of the protoplasmic membranes, so that cell sap oozes out and cell death occurs. Before visible damage symptoms on leaves can be observed, a reduction of growth rate occurs. Smog effects the reactions in which the growth hormone takes part and not the growth hormone itself. No practical protection for plants against smog damage has been found and the only effective means of filtering smog from greenhouse air is by carbon filtration.

1526

- 1958
WE'RE LEARNING ABOUT AIR CHEMISTRY. Oil and Gas Jour., v. 56, Feb. 17, 1958: 98-100. DLC (TN860.O4, v. 56)

Air pollution projects carried out under contract at research centers in the U. S. are outlined. Fields currently being investigated are: (1) reactions of hydrocarbons; (2) sources of gaseous carbon materials; (3) plant damage caused by air pollution; (4) effects of meteorological conditions; and (5) chromatographic gas analysis methods as applied to automobile exhaust gases. Leaky valves were found to be contributing about 13 tons of hydrocarbons daily of which 7.5 tons were in a gaseous state. In Los Angeles, refineries contribute about 105 tons of hydrocarbons per day, as compared to approximately 1,200 tons daily from automobiles and 500 tons daily from solvents used in painting, dry cleaning, etc., and 115 tons from incinerators.

1527

1957
WET TYPE DUST COLLECTOR. Air Conditioning, Heating and Ventilating, v. 54, July 1957: 94.
DLC (TH7201.H4, v. 54)

The microdyne dust collector described is a wet, inertial type that has an efficiency of over 99% in collecting dust particles of five microns or greater. The dust-laden water is captured at the periphery of the eliminator section in blind louvers which are connected to a disposal sump at the bottom of the unit. If sufficient pressure to drive the gases is not available ahead of the collector, a vaneaxial fan may be attached at the rear of the unit. Capacity for the unit ranges from 1500 to 48,000 cu ft/min.

1528

1952
WHAT CITY CODES STATE. Indus. and Power, v. 62, Jan. 1952: 74-76.
DLC (TJ1.H7, v. 62)

A discussion of municipal smoke regulations is presented including various limitations of short-duration smoke emissions. Definitions of permissible volatile content in a smokeless solid fuel, as contained in ordinances, vary from a high of 31 to a low of 17% (maximum volatile content in most cities is 23%). Tabulated data (e.g., on prohibited air contaminants, test methods, dense smoke standards, fuel burning regulations, smokeless fuel control, etc.) are listed from a survey of 66 U. S. cities. Penalties for violations vary considerably in the ordinances reviewed. Comprehensive codes usually provide that an offender notified of three violations must appear at a hearing before the smoke abatement administrator.

1529

1957
Whitby, K. T., A. B. Algren, R. C. Jordan, and J. C. Annis.
THE ASHAE AIR-BORNE DUST SURVEY. (Paper presented at the 50th Annual Meeting of the Air Pollution Control Association held at St. Louis, Mo., June 2-6, 1957). Jour. Air Pollut. Control Assoc., v. 7, Nov. 1957: 157-167.
DLC (TD883.A48, v. 7)
Also published in: Heating, Piping, and Air Conditioning, v. 29, Nov. 1957: 185-192.
DLC (TH7201.H45, v. 29)

When it became evident from a search of the existing literature that inadequate data existed on which to base the selection of suitable test dusts for simulated air cleaner testing, a limited dust survey was organized. Participation was limited to the University of Minnesota and to four members of the Technical Advisory Committee on Air Cleaning of the American Society of Heating and Air Conditioning Engineers [ASHAE]. Sampling locations in each city were limited to those where the sampling pump would not become a nuisance and where it could be readily accessible to the sponsor. Findings from this survey led to the development of several new dust sampling and evaluation techniques and the modification of several old ones. The survey is to be extended to consider the loading characteristics of representative types of filters under typical operating conditions. The small, quiet, and inexpensive diaphragm pump used in the A. I. S. I. smoke sampler was used, mounted in a box with glass fiber insulation, and with monthly calibration for accuracy of the estimated air volume sampled. Filter holders for the unmounted 47-mm size millipore filters were made from the commercially available 47-mm size plastic petri dishes. An assembly of the pump and holders for simultaneous indoor and outdoor sampling, is pictured in the text. Standard microscopic slides resting on small wood blocks were used for sampling of dust fall. Optical density of the loaded millipore filters, and of lint samples caught on the stainless steel screen placed ahead of the filter, was determined with an improved photometer. Various equations necessary to these evaluations were established. For this study it was desired to measure or calculate the volume and area size distribution of dust particles. The centrifuge sedimentation analysis method was chosen as the primary method; a limited number of analyses were made with light and electron microscopes to supplement and check the sedimentation data. Sedimentation data were compared with the results obtained by other investigators with the jet impactor, particle counter, and parallel plate air settling chamber. Important conclusions from this survey and from the analysis of work by other investigators, are tabulated. Because of the limited number of samples and sampling locations in the present survey, the numerical values in this tabulation represent a combination of straightforward statistical weighing and judgment based on less tangible factors. It should be emphasized that results, to a certain extent, are dependent on the analysis methods used. Some information on the properties and concentration of dust particles, and some miscellaneous conclusions, are given.

1530

1955
White, A. J.
SAMPLING AIR BY VACUUM FROM AUTO MANIFOLD. Chem. Eng., v. 62, Oct. 1955: 218, 220.
DLC (TN1.M45, v. 62)

A method is described by which it is possible to take air samples under any weather conditions using an instrument housed inside a station wagon. The vacuum system usually employed to operate the vehicle's windshield wipers serves the sampling setup.

1531

- White, H. J. 1957
FIFTY YEARS OF ELECTROSTATIC PRECIPITATION.
(Paper presented at the 50th Annual Meeting of the Air
Pollution Control Association, held at St. Louis, Mo.,
June 2-6, 1957). Jour. Air Pollut. Control Assoc., v.
7, Nov. 1957: 166-177. DLC (TD883. A48, v. 7)

This is a recounting of the historical origins, growth, and significance of electrostatic precipitation as a major element in the control of air pollution. Just 50 years ago, F. G. Cottrell of the Chemistry Department of the University of California succeeded in converting the method from a laboratory curiosity to a successful engineering process. The electrical approach to air cleaning, based on Sir Oliver Lodge's work, had been tried unsuccessfully some 20 years earlier in England in an attempt to collect lead oxide fume. Cottrell's success was based on the intuitive use of the then rapidly developing field of alternating-current electricity, and his adaptation of the high-voltage transformer and synchronous switch rectifier to his purpose. The rapid and widespread application of electrostatic precipitation for controlling air pollution in the smelter and cement industries, is directly attributable to the work of Cottrell, aided by the contributions of W. A. Schmidt. Application to other industries then occurred, and there was further expansion following World War II. Application of electrostatic precipitation is discussed in relation to the following: copper, lead, and zinc smelters, precious metals, cement industry, chemical industry, detarring of fuel gases, black smoke, carbon black, paper mills, electric power industry, and in air cleaning.

1532

- Whittaker, H. A., 1952
J. Buxell, G. M. Fair, S. Pincus, A. C. Stern, and
H. Wexler.
SOME LEGAL ASPECTS OF AIR POLLUTION CONTROL.
American Public Health Association Yearbook, 17th
year, 1951-1952 (Part II of the American Jour. Publ.
Health, v. 42, May 1952): 94-98.
DLC (RA421. A41, v. 42)

In this report of the Committee on Air Hygiene, it is stated that there are two general approaches to air pollution control: declaration of a public or private nuisance, and specific legislation. Air pollution per se is not considered to be a common-law nuisance unless it is proved to interfere materially with the enjoyment of life and property; the plaintiff, either an individual or a public body, has the burden of proof both that the nuisance exists and that it is caused by the specific source. Provided a case is made out for interference with the enjoyment of life and property, it is not necessary to prove actual injury to health or serious physical damage to property. The right of an individual to bring a nuisance action into court is limited only by his ability to pay the costs. Because of the difficulties of proving a nuisance condition, legislation by municipalities or by states has been enacted either to declare air pollution to be a public nuisance per se or to forbid and regulate various practices in order to promote the welfare and comfort of the people. State agencies, either to control smoke and air pollution or to aid local or regional control

bodies, are now being considered, for California, Illinois, Maryland, Minnesota, New Jersey, New York, Oregon, and Utah. Sections are quoted from the New York City ordinances of February 1949, on air pollution which includes standards for emission.

1533

- Wilcox, J. D. 1953
DESIGN OF A NEW FIVE-STAGE CASCADE IMPACTOR. Arch. Indus. Hyg. and Occupat. Med., v. 7,
May 1953: 376-382. DLC (RC963. A14, v. 7)

After a study of the theory of impaction, the derivation of an equation, and comparison of some experimental results with theoretical results, the accumulated data were used to work out a design and model of a 5-stage impactor. The impactor is capable of efficient sampling over a particle size range of 0.2 to 100 microns. Satisfactory size-graded samples have been obtained using the impactor on heterogeneous clouds. However, below a certain size, depending on the geometry of the last jet of the impactor and the physical properties of the particle, the collection probability decreases.

1534

- Wilford, A. T. 1957
AIR POLLUTION FROM ROAD TRANSPORT: THE
VEHICLE OPERATOR'S VIEWPOINT. Gas and Oil
Power, v. 52, no. 634 (Annual Tech. Review Number),
1957: 318-320. DLC (TJ751. G22, v. 52)

Dense exhaust smoke, either continuous or intermittent, is due to one or both of two main sources: over-injection of fuel or lack of maintenance. The fuel injection pump is designed to meter very small amounts of fuel which are introduced into the cylinders during each engine cycle. The contribution of a poorly maintained engine to air pollution is discussed. Fuel characteristics, particularly sulfur content, are responsible for the formation of objectionable constituents in the exhaust products.

1535

- Willett, H. P. 1956
CHOICE OF MATERIALS FOR GAS SCRUBBERS. Chem.
Eng., v. 63, July 1956: 228, 230, 232, 234, illus.
DLC (TN1. M45, v. 63)

The Pease-Anthony type of cyclonic scrubber and the Venturi scrubber are discussed and illustrated. The cyclonic scrubber is essentially a vertical cylindrical tank in which the gas enters tangentially, spiraling through a spray zone where dust and atomized water originating from central sprays coalesce to form agglomerates. These are removed in the separating zone by the centrifugal force of the spinning gas stream. The cleaned gas leaves at the top, while the scrubbing liquid containing the contaminant is withdrawn from the bottom. These scrubbing units are designed for collecting dusts larger than 1 micron in diameter and are not effective

on fumes or submicron dusts. In a Venturi scrubber, the gas to be cleaned enters a constricted section where it is accelerated to high velocities, the scrubbing liquid being injected at right angles to the flow of gas. The violent impact of gas on liquid at this point is responsible for the good performance of this type of scrubber on collection of submicron size particles. The rest of the scrubber is simply a centrifugal-type entrainment separator, and contains no spray. In addition, factors influencing the choice of construction material for scrubbers are considered including the corrosive action of the contaminants, the high temperatures of the gases, and the presence of abrasive solids. A specific gas-cleaning problem is discussed from the standpoint of the selection of applicable equipment.

1536

- Williams, A. W. 1952
LET'S BE SANE ABOUT SMOKE ABATEMENT. Utilization, v. 6, Apr. 1952: 49-56.
DLC (TP315. U85, v. 6)

A revue and description of air pollution control devices is presented. Smoke density recording, essential to good combustion practice, can be achieved by electronic smoke indicators of the flush-mounted or of the surface-mounted type. The problem of coal segregation, which causes erosion in the stokers, can be overcome by specially designed distributors. Overfire air jets, used in many coal-fired steam plants, eliminate smoke, reduce fly ash emission, and are more economical than steam jets. A flue-gas analyzer determines whether the proper amount of air is being supplied to the firebox for complete gas combustion. The combustion control for a pulverized coal-fired boiler consists of a master controller, one or more fuel feed regulators, an air flow regulator and a furnace draft regulator. Elimination of fly ash is obtained by a low-draft-loss flue dust collector, which uses a minimum of power. Automatic coal scales are used to check the efficiency of the boiler. At the American Tobacco Company, Richmond, Va., 3 existing boilers were reconditioned, resulting in an operating capacity of 250% over the previous rating. An all-electric combustion control system was installed, consisting of a master controller, an air flow controller, a fuel feed controller, and furnace draft controllers, one for each boiler. Soot blowing can be achieved by the automatic-sequential system, which makes it a simple push-button operation from a central control panel.

1537

- Williams, C. R. 1957
FLUORIDE AIR POLLUTION. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956.) Publ. Health Rep., v. 72, Jan. 1957: 73-75.
DLC (RA11. B17, v. 72)

Some fluoride loss occurs in calcining or sintering phosphate rock. In the production of superphosphates, large quantities of the gaseous fluorides, hydrogen fluoride and silicon tetrafluoride, are released. The nature of these operations (fertilizer production) calls for the

location of the plants in agricultural areas. Fluorides used in production of steel and aluminum are another large-scale source of pollution. Control by the installation of sprays and roof monitors to trap the fluorides has been unsatisfactory. Scrubbing systems are costly, and their effectiveness depends primarily on the kind of hood, the volume of air, and the type of scrubber used. Damage claims resulting from injury to cattle and vegetation in the Pacific northwest indicate that aluminum reduction plants cannot operate without controlling fluoride effluents. It is almost impossible to set permissible levels for the amount of fluoride emitted. The seriousness of the problem depends on the amount of the emission and its distribution; time is also a factor since gaseous fluorides may be retained and stored in vegetation. Although the fluoride levels that damage vegetation vary with species over an extreme range continuous sampling of vegetation is the most satisfactory way of evaluating fluoride pollution of the air. Fluoride levels should be kept below 30 ppm to prevent damage to the cattle eating contaminated vegetation.

1538

- Willmott, T. E. 1952
SMOKELESS ZONES AND PRIOR APPROVAL. I. SMOKELESS ZONES. (From papers by the Coventry Smoke and Factory Inspectors, read at a meeting of the Sanitary Inspectors' Association in Coventry, on Nov. 15, 1951). Smokeless Air, v. 22, Spring 1952: 120-122.
DLC (TD884. S945, v. 22)

The first smokeless zone in England came into being at Coventry on March 1st, 1951, through Section 51 of the Coventry Corporation Act, 1948. This zone which was small in area (about 30 acres) was set up in the center of the town, in the section which had been destroyed during the war and was being rebuilt at the time of enactment of the new ordinance. The trend in this as in other smokeless zones was toward use of electricity, gas, or solid fuels for heating. Since the emission of smoke in this area constitutes an offense, and a nuisance might be created by using some of the "smokeless" fuels, any emission from coke, anthracite, or other similar fuels constitutes a violation even when used in an appliance suitable for burning these fuels. Expansion of a smokeless zone demands consideration of such factors as availability of fuel and of suitable appliances. But in order to be effective, such expansion should be progressive and should not be delayed too long.

1539

- Wilson, M. E., 1956
and D. C. Harrod.
DEVELOPMENT OF MECHANICAL BREATHERS FOR EVALUATION OF RESPIRATORY EQUIPMENT. Army Chemical Corps, Fort Detrick, Md. Interim Report No. 126, May 1956. 10 p., illus.
DLC-Sci

A cam-driven, piston-cylinder type of mechanical breather has been developed which simulates breathing of human subjects in sedentary position and working at rates varying from light to moderately heavy (208, 415, 622 and 830 kilogram-meters (Kgm) per minute). The

cams for this mechanical breather were plotted from the patterns recorded by Silverman, et al, in OGRD Report No. 5732, which includes a pause as an integral part of the sedentary subject's cycle. The pause is significant in that it renders a more severe test for protective respiratory items. Research laboratories can utilize this mechanical breather to obtain more accurate evaluation of protective respiratory equipment than was possible in the past. (Authors' summary)

1540

- [Wohlert, H. C.] 1956
EMISSIONS FROM INDUSTRIAL SOURCES. In Lunde, K. E. Investigation of Air Pollution in the Vicinity of Portland, Oregon. Stanford Research Inst., Stanford Univ., Calif. Final report, Oct. 4, 1956. p. 57-82, illus. (S.R.I. Project no. S-1674).

DLC (TD883.S8)

Data are given on the potential exhaust emissions from industrial sources in the Portland, Oreg., metropolitan area. Emissions from the burning of fuels are also considered. Tabular information is given for: (1) industrial establishments including the plant size and number of employees in 1954-1955; (2) industrial activity in 1954-1955 including Btu's (10^7) consumed daily by 20 classes of industry (electrical energy not considered); (3) exhaust emissions from the primary metal industries (general); (4) exhaust emissions from specific metal industries, e.g., gray iron foundries, nonferrous foundries, and aluminum reduction plants; (5) exhaust emission from the food and kindred products industry, e.g., beverage and confectionery production; (6) exhaust emissions from the paper and allied products industry; (7) exhaust emissions from sulfite pulp process plants, and from kraft pulp mills; (8) exhaust emissions from stone, clay, and glass manufacture; (9) averaged exhaust emissions from the inorganic and organic chemical plants; (10) exhaust emissions from the chemical and allied products industry; (11) exhaust emissions from the lumber and lumber products (except furniture) industry; and (12) the potential daily emissions from industrial sources.

1541

- [Wohlert, H. C.] 1956
EMISSIONS FROM WASTE INCINERATION. In Lunde, K. E. Investigation of Air Pollution in the Vicinity of Portland, Oregon. Stanford Research Inst., Stanford Univ., Calif. Final Report, Oct. 4, 1956. p. 23-35, illus. (S.R.I. Project no. S-1674).

DLC (TD883.S8)

The total gaseous and particulate emissions from all types of waste incineration, in the Portland, Oreg., metropolitan area are summarized. The materials discharged by each type of incineration are discussed separately. A comparison is made with data obtained in the Los Angeles Calif., area. Data for both Portland and Los Angeles indicate that "organics" are emitted in the largest quantities, followed by solids and aldehydes. Extensive tabular data are presented for: (1) total emissions for all types of incineration in Portland; (2) incinerator emissions in Los Angeles for 1954; (3) emissions

from municipal incinerators; (4) chemical analysis of solids emitted from municipal incinerators; (5) emissions from commercial (industrial) incinerators; (6) emissions from backyard incinerators; and (7) emissions from waste-wood incinerators.

1542

- [Wohlert, H. C.] 1956
EXHAUST EMISSIONS FROM FUEL CONSUMPTION. In Lunde, K. E. Investigation of Air Pollution in the Vicinity of Portland, Oregon. Stanford Research Inst., Stanford Univ., Calif. Final Report, Oct. 4, 1956. p. 36-56, illus. (S.R.I. Project no. S-1674).

DLC (TD883.S8)

Data are given on the exhaust emissions from all types of fuel consumption, both public and industrial for heat and power purposes in the Portland, Oreg., area. Information is presented in tables on: (1) fuels consumed in 1954-1955; (2) fuels consumed by industry in 1947, and 1954-1955; (3) products of combustion from the burning of various fuels for heat and power purposes; (4) industrial exhaust emissions from the burning of coal, fuel oil, and manufactured gas; (5) exhaust emissions from the public consumption of fuel oil, and manufactured gas; (6) exhaust emissions from the military consumption of fuel oil; (7) exhaust emissions from power plant operations using fuel oil; (8) exhaust emissions from ships and locomotives; (9) estimated automobile exhaust emissions (tons/100,000 gal of gasoline consumed); (10) estimated hydrocarbon losses from gasoline-handling operations; (11) emissions from diesel vehicle exhausts; and (12) emissions from airplane exhausts.

1543

- [Wohlert, H. C.] 1956
MISCELLANEOUS EMISSIONS AND SUMMARY OF EXHAUST EMISSIONS IN PORTLAND AREA. In Lunde, K. E. Investigation of Air Pollution in the Vicinity of Portland, Oregon. Stanford Research Inst., Stanford Univ., Calif. Final Report, Oct. 4, 1956. p. 83-90. (SRI Project no. S-1674).

DLC (TD883.S8)

Miscellaneous exhaust emissions and unevaluated air pollution sources are discussed briefly. Typical complaints received by the Bureau of Public Health (New Haven, Conn.) concerning air pollution are listed, and it is noted that most of them are also characteristic of the Portland, Oreg., area. Tabular data are presented for: (1) emissions from sources not classified elsewhere, e.g., brush piling, solvent manufacturing, degreasing operations, etc.; (2) exhaust emissions in the Portland metropolitan area; (3) comparison of emissions in the Portland and Los Angeles, Calif., areas; (4) projected exhaust emissions in the Portland area, 1960 and 1965; and (5) estimated exhaust emissions resulting from an introduction of natural gas in the Portland area.

1544

- Wong, J. B., 1956
W. E. Ranz, and H. F. Johnstone.
COLLECTION EFFICIENCY OF AEROSOL PARTICLES
AND RESISTANCE TO FLOW THROUGH FIBER MATS.
Jour. Appl. Phys., v. 27, Feb. 1956: 161-168.
DLC (QC1.J83, v. 27)

The collection efficiencies for sulfuric acid aerosols of .04- to 1.3-micron particle diameter, and the resistance to flow through glass fiber mats composed of 3.5-, 6.2- and 9.6-micron fibers, were investigated experimentally. The results agree with the theory that particle collection in this range is a function of the inertia of the particles, the interception by the fibers, and the nature of the flow pattern around the fiber. The pressure drop is a function of the flow characteristics and the fiber interference effect. Theoretical equations for collection efficiency and pressure drop of mats were analyzed in terms of the impaction efficiency and drag coefficient of single fibers. These equations were evaluated by comparing the apparent fiber efficiency and drag with theoretical values. (Authors' abstract, in part)

1545

- Woodall, J. D. C. 1957
ATMOSPHERIC POLLUTION AND THE DEMAND FOR
SMOKELESS FUELS. Heating and Air Treatment Engineer, v. 20, Dec. 1957: 299-302.
DLC (TH7201.A4, v. 20)

The paper estimates that nearly 50% of the smoke in air comes from domestic chimneys. The cheapest and most readily available smokeless fuel to replace house coal is coke. A discussion is included of conversion costs involved in replacing unsatisfactorily operating domestic fire installations with smokeless units for solid and gas fires.

1546

- Wright, B. M. 1957
EXPERIMENTAL STUDIES ON THE RELATIVE IMPORTANCE OF CONCENTRATION AND DURATION OF EXPOSURE TO DUST INHALATION. Brit. Jour. Indus. Med., v. 14, Oct. 1957: 219-227.
DLC (RC963.A23, v. 14)

An experimental technique is presented for comparing groups of animals exposed to inhalation of dust clouds of controlled concentrations, and a method is described of measuring the animals' average exposures. Three experiments are described in which two groups of rats were exposed to the inhalation of dust, one group being exposed for 20 hr a day, and the other for 2 hr to a concentration 10 times greater, so that the two groups received the same daily dose. In the first two experiments the animals were exposed to relatively high concentrations of aluminum oxide dust and in the third to moderate concentrations of coal dust for 18 months. In all three tests the amount of dust retained by the two groups was very similar but the high concentration group always

retained rather less (20-30% less) than the low concentration group. The validity and implications of these findings are discussed.

1547

- Wright, F. 1957
DYNAMIC DUST AND FUME PRECIPITATORS. (Abstract of paper presented at the Conference of the Iron and Steel Institute, London, Sept. 25-26, 1957). Smokeless Air, v. 28, Winter 1957: 126.
DLC (TD884.S855, v. 28)

The considerations underlying the selection of dust collectors are outlined with a brief discussion of their basic principles. The wide variety of commercial designs available precludes individual detailed descriptions and the present paper deals primarily with "Rotoclone" dynamic and hydrodynamic precipitators. (Quoted in full)

1548

- Wynne-Jones, W. F. K. 1953
THE COMBUSTION AND REACTIVITY OF CARBON. (Paper presented at the Sixth Conference of the British Coke Research Association, London, Oct. 28, 1953). Jour. Inst. Fuel, v. 26, Dec. 1953: 317-320.
DLC (TP315.I6, v. 26)

This summary of the author's lecture includes the statement that the requirements in a blast furnace are such that a coke of high reactivity might, by reducing carbon dioxide at too low a temperature, increase the amount of carbon monoxide in the exit gas, and therefore be less satisfactory than a coke of medium or low reactivity. The need for a simple method for determining reactivity is met by the development of a critical air-blast test, which also showed the effect of added impurities in altering the reactivity of coke. Iron salts and sodium carbonate were found to have a considerable influence, other mineral compounds had a much smaller effect; the effect of impurities was far greater than was generally supposed.

1549

- Yocum, J. E., 1952
and J. A. Eibling.
AIR POLLUTION RESEARCH AT BATTELLE. Air Repair, v. 2, Nov. 1952: 10-12, illus.
DLC (TD883.A48, v. 2)

A survey of smoke abatement studies at the Fuels Division of Battelle Memorial Institute is presented. The minimum height to which the stacks of a plant would have to be extended in order to prevent downwashing of stack gases was determined by smoke bomb tests. Airborne dusts or gases were sampled by a sampling-tube device raised to a predetermined altitude above the ground by kite-balloons. Directional dirt-fall collectors, developed at Battelle, collect wind-swept dirt from all directions, as well as dirt which settles during the calm periods. The Institute has worked for years

AIR POLLUTION BIBLIOGRAPHY

on a variety of combustion projects ranging from small room heaters to large boilers. Among these are the following: (1) model studies of fly ash collectors, initiated in an effort to develop low-cost collectors; (2) an investigation to determine optimum proportions of overfire steam-air jets; and (3) research on railroad locomotives, including the effects on performance of type and size of coal and on performance of front-end design. Full-scale combustors were constructed, operating at atmospheric rather than high pressure and yielding combustion efficiencies above 90%, with satisfactory results in air cooling and without ash deposition. Further fundamental research was conducted, such as a study of water-gas reaction and research to improve home heating devices. In particular, research was undertaken on a method for burning bituminous coals in non-mechanical, hand-fired heaters, or in furnaces with substantially smokeless operation. Residential stokers have been adapted to a wider range of bituminous coals, with improvement of performance, with use of further automatic devices, and with the establishment of the proper types of coal for stokers already available.

1550

Zimmerman, P. W., 1956
and A. E. Hitchcock.
SUSCEPTIBILITY OF PLANTS TO HYDROFLUORIC
ACID AND SULFUR DIOXIDE GASES. Contr. Boyce

Thompson Inst., v. 18, Jan.-Mar. 1956: 263-279,
illus. DLC (QK1. B865, v. 18)

The effects of hydrofluoric acid (HF) and sulfur dioxide (SO₂) gases were determined and compared on 49 species of plants. At given concentrations and periods of exposure some species of plants were susceptible to HF but resistant to SO₂, and some species susceptible to SO₂ were resistant to HF. A few species were equally susceptible to both gases, and some were equally resistant. In tests with HF alone, concentrations of the gas ranged from less than 1 to 100 ppb (10⁹), by volume, and periods of exposure were usually 6 to 8 days. The concentration for SO₂ gas ranged from 0.2 to 1.1 ppm (10⁶), and the time periods for exposure to the gas were 2 to 8 hr. Special equipment and methods were developed for fumigating plants in the field and in greenhouses. Stomatal counts for either the upper or the lower epidermis of leaves showed no relation between the number of stomata/unit leaf area and relative susceptibility to either gas. All species of plants grown in pots or under field conditions stored fluorine. A few like dogwood (*Cornus florida* L.), *Deutzia* sp., gifblaar (*Dichapetalum cymosum* Hook.), and *Camellia* sp. accumulated abnormally large amounts of fluorine in the leaves. There was considerable difference in rate of absorption by different species when the plants were fumigated, and different parts of the plant absorbed different amounts of fluorine. These results should serve as an aid in diagnosing symptoms on vegetation around industrial areas. (Authors' abstract)

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